EPA

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EPA-OTS

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Comprehensive Assessment Information Rule

REPORTING FORM

89 JUN -6 PM 3:09

CONTAINS NO CBI

When completed, send this form to:

Document Processing Center
Office of Toxic Substances, TS-790
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
Attention: CAIR Reporting Office

For Agency Use Only:

Date of Receipt: _____

Document
Control Number: _____

Docket Number: _____

EPA Form 7710-52

SECTION 1 GENERAL MANUFACTURER, IMPORTER, AND PROCESSOR INFORMATION

PART A GENERAL REPORTING INFORMATION

1.01 This Comprehensive Assessment Information Rule (CAIR) Reporting Form has been completed in response to the Federal Register Notice of..... [1][2] [2][2] [8][8]
mo. day year

CBI

[ ] a. If a Chemical Abstracts Service Number (CAS No.) is provided in the Federal Register, list the CAS No. ..... [ ][ ][ ][5][8][4]-[8][4]-[9]

b. If a chemical substance CAS No. is not provided in the Federal Register, list either (i) the chemical name, (ii) the mixture name, or (iii) the trade name of the chemical substance as provided in the Federal Register.

(i) Chemical name as listed in the rule ..... _____

(ii) Name of mixture as listed in the rule .... _____

(iii) Trade name as listed in the rule ..... _____

c. If a chemical category is provided in the Federal Register, report the name of the category as listed in the rule, the chemical substance CAS No. you are reporting on which falls under the listed category, and the chemical name of the substance you are reporting on which falls under the listed category.

Name of category as listed in the rule ..... _____

CAS No. of chemical substance ..... [ ][ ][ ][ ][ ][ ]-[ ][ ]-[ ]

Name of chemical substance ..... _____

1.02 Identify your reporting status under CAIR by circling the appropriate response(s).

CBI

Manufacturer 1

[ ] Importer 2

Processor ..... (3)

X/P manufacturer reporting for customer who is a processor 4

X/P processor reporting for customer who is a processor 5

[ ] Mark (X) this box if you attach a continuation sheet.

NOTE: N/A = NOT APPLICABLE

1.03 Does the substance you are reporting on have an "x/p" designation associated with it in the above-listed Federal Register Notice?

CBI

[ ]

Yes ..... [X] Go to question 1.04

No ..... [ ] Go to question 1.05

1.04 a. Do you manufacture, import, or process the listed substance and distribute it under a trade name(s) different than that listed in the Federal Register Notice? Circle the appropriate response.

CBI

[ ]

(Yes) 1

No 2

b. Check the appropriate box below:

[ ] You have chosen to notify your customers of their reporting obligations

Provide the trade name(s) .... _____

_____

[ ] You have chosen to report for your customers

[X] You have submitted the trade name(s) to EPA one day after the effective date of the rule in the Federal Register Notice under which you are reporting.

N/A 1.05 If you buy a trade name product and are reporting because you were notified of your reporting requirements by your trade name supplier, provide that trade name.

CBI

[ ]

Trade name ..... _____

Is the trade name product a mixture? Circle the appropriate response.

Yes 1

No 2

1.06 Certification -- The person who is responsible for the completion of this form must sign the certification statement below:

CBI

[ ] "I hereby certify that, to the best of my knowledge and belief, all information entered on this form is complete and accurate."

Nicholas J. Barone — NAME

Nicholas J. Barone — SIGNATURE

6/5/89 — DATE SIGNED

Manager, Regulatory Svcs. — TITLE

(203) 271 - 4190 — TELEPHONE NO.

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 1.07 Exemptions From Reporting -- If you have provided EPA or another Federal agency with the required information on a CAIR Reporting Form for the listed substance within the past 3 years, and this information is current, accurate, and complete for the time period specified in the rule, then sign the certification below. You are required to complete section 1 of this CAIR form and provide any information now required but not previously submitted. Provide a copy of any previous submissions along with your Section 1 submission.

CBI
[ ]

"I hereby certify that, to the best of my knowledge and belief, all required information which I have not included in this CAIR Reporting Form has been submitted to EPA within the past 3 years and is current, accurate, and complete for the time period specified in the rule."

NAME	SIGNATURE	DATE SIGNED
TITLE	(_____) _____ - _____ TELEPHONE NO.	DATE OF PREVIOUS SUBMISSION

N/A 1.08 CBI Certification -- If you have asserted any CBI claims in this report you must certify that the following statements truthfully and accurately apply to all of those confidentiality claims which you have asserted.

CBI
[ ]

"My company has taken measures to protect the confidentiality of the information, and it will continue to take these measures; the information is not, and has not been, reasonably ascertainable by other persons (other than government bodies) by using legitimate means (other than discovery based on a showing of special need in a judicial or quasi-judicial proceeding) without my company's consent; the information is not publicly available elsewhere; and disclosure of the information would cause substantial harm to my company's competitive position."

NAME	SIGNATURE	DATE SIGNED
TITLE	(_____) _____ - _____ TELEPHONE NO.	

[ ] Mark (X) this box if you attach a continuation sheet.

PART B CORPORATE DATA

1.09 Facility Identification

CBI Name [O][L][I][N][ ][C][O][R][P][O][R][A][T][I][O][N][ ][ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Address [6][3][6][7][ ][E][A][S][T][L][A][N][D][ ][R][O][A][D][ ][ ][ ][ ][ ][ ][ ]
Street

[B][R][O][O][K][ ][P][A][R][K][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[O][H] [4][4][1][4][2]--[ ][ ][ ][ ]
State Zip

Dun & Bradstreet Number .....[1][0]-[7][1][1]-[2][8][4][9]

EPA ID Number .....[O][H][0][0][4][5][2][1][4]

Employer ID Number .....[ ][ ][ ][ ][ ][ ][ ][ ]

Primary Standard Industrial Classification (SIC) Code .....[3][0][8][7]

Other SIC Code .....[ ][ ][ ][ ]

Other SIC Code .....[ ][ ][ ][ ]

1.10 Company Headquarters Identification

CBI Name [O][L][I][N][ ][C][O][R][P][O][R][A][T][I][O][N][ ][ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Address [1][2][0][ ][L][O][N][G][ ][R][I][D][G][E][ ][R][D][ ][ ][ ][ ][ ][ ][ ]
Street

[S][T][A][M][F][O][R][D][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[C][T] [0][6][9][0][4]--[ ][ ][ ][ ]
State Zip

Dun & Bradstreet Number .....[0][0]-[1][3][3]-[8][0][8][6]

Employer ID Number .....13.[-][1][8][7][2][3][1][9]

[ ] Mark (X) this box if you attach a continuation sheet.

1.11 Parent Company Identification

CBI Name [O][L][I][N][ ][C][O][R][P][O][R][A][T][I][O][N][ ][ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Address [1][2][0][ ][L][O][N][G][ ][R][I][D][G][E][ ][R][D][ ][ ][ ][ ][ ][ ][ ][ ]
Street

[S][T][A][M][F][O][R][D][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[C][T] [0][6][9][0][4]--[ ][ ][ ][ ]
State Zip

Dun & Bradstreet Number .....[0][0]-[1][3][3]-[8][0][8][6]

1.12 Technical Contact

CBI Name [R][ ][A][ ][Y][U][R][C][I][S][I][N][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

[ ] Title [T][E][C][H][N][I][C][A][L][ ][M][A][N][A][G][E][R][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Address [H][I][G][H][W][A][Y][ ][9][3][3][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
Street

[B][R][A][N][D][E][N][B][U][R][G][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
City

[K][Y] [4][0][1][0][8]--[ ][ ][ ][ ]
State Zip

Telephone Number .....[5][0][2]-[4][2][2]-[2][1][0][1]

1.13 This reporting year is from ..... [0][1] [8][8] to [1][2] [8][8]
Mo. Year Mo. Year

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 1.14 Facility Acquired -- If you purchased this facility during the reporting year, provide the following information about the seller:

CBI Name of Seller [__]

[__] Mailing Address [__]
Street

[__]
City

[__][__] [__][__][__][__][__]--[__][__][__][__]
State Zip

Employer ID Number .....[__][__][__][__][__][__][__][__][__]

Date of Sale .....[__][__] [__][__] [__][__]
Mo. Day Year

Contact Person [__]

Telephone Number .....[__][__][__]-[__][__][__]-[__][__][__][__]

N/A 1.15 Facility Sold -- If you sold this facility during the reporting year, provide the following information about the buyer:

CBI Name of Buyer [__]

[__] Mailing Address [__]
Street

[__]
City

[__][__] [__][__][__][__][__]--[__][__][__][__]
State Zip

Employer ID Number .....[__][__][__][__][__][__][__][__][__]

Date of Purchase .....[__][__] [__][__] [__][__]
Mo. Day Year

Contact Person [__]

Telephone Number .....[__][__][__]-[__][__][__]-[__][__][__][__]

[__] Mark (X) this box if you attach a continuation sheet.

1.16 For each classification listed below, state the quantity of the listed substance that was manufactured, imported, or processed at your facility during the reporting year.

CBI	Classification	Quantity (kg/yr)
[ ]	Manufactured	N/A
	Imported	N/A
	Processed (include quantity repackaged)	3422
	Of that quantity manufactured or imported, report that quantity:	
	In storage at the beginning of the reporting year	N/A
	For on-site use or processing	N/A
	For direct commercial distribution (including export)	N/A
	In storage at the end of the reporting year	N/A
	Of that quantity processed, report that quantity:	
	In storage at the beginning of the reporting year	44
	Processed as a reactant (chemical producer)	N/A
	Processed as a formulation component (mixture producer)	4132
	Processed as an article component (article producer)	N/A
	Repackaged (including export)	
	In storage at the end of the reporting year	250

[ ] Mark (X) this box if you attach a continuation sheet.

PART C IDENTIFICATION OF MIXTURES

N/A 1.17 Mixture -- If the listed substance on which you are required to report is a mixture or a component of a mixture, provide the following information for each component chemical. (If the mixture composition is variable, report an average percentage of each component chemical for all formulations.)

CBI

[ ]

Component Name	Supplier Name	Average % Composition by Weight (specify precision, e.g., 45% ± 0.5%)
	Total	100%

[ ] Mark (X) this box if you attach a continuation sheet.

2.04 State the quantity of the listed substance that your facility manufactured, imported, or processed during the 3 corporate fiscal years preceding the reporting year in descending order.

CBI

[ ] Year ending ..... [1][2] Mo. [8][7] Year

Quantity manufactured ..... _____ kg

Quantity imported ..... _____ kg

Quantity processed ..... 103,043 kg

Year ending ..... [1][2] Mo. [8][6] Year

Quantity manufactured ..... _____ kg

Quantity imported ..... _____ kg

Quantity processed ..... ~~DATA~~ NOT AVAILABLE kg

Year ending ..... [1][2] Mo. [8][5] Year

Quantity manufactured ..... _____ kg

Quantity imported ..... _____ kg

Quantity processed ..... ~~DATA~~ NOT AVAILABLE kg

N/A 2.05 Specify the manner in which you manufactured the listed substance. Circle all appropriate process types.

CBI

[ ]

Continuous process 1

Semicontinuous process 2

Batch process 3

[ ] Mark (X) this box if you attach a continuation sheet.

2.06 Specify the manner in which you processed the listed substance. Circle all
CBI appropriate process types.

[ ]

Continuous process 1

Semicontinuous process 2

(Batch process) ..... (3)

N/A 2.07 State your facility's name-plate capacity for manufacturing or processing the listed substance. (If you are a batch manufacturer or batch processor, do not answer this
CBI question.)

[ ]

Manufacturing capacity ..... _____ kg/yr

Processing capacity ..... _____ kg/yr

2.08 If you intend to increase or decrease the quantity of the listed substance manufactured, imported, or processed at any time after your current corporate fiscal year, estimate the increase or decrease based upon the reporting year's production
CBI volume.

[ ]

	Manufacturing Quantity (kg)	Importing Quantity (kg)	Processing Quantity (kg)
Amount of increase			
Amount of decrease			*

*Will not process in future - No market demand, facility shutting down 3-89.

[ ] Mark (X) this box if you attach a continuation sheet.

2.09 For the three largest volume manufacturing or processing process types involving the listed substance, specify the number of days you manufactured or processed the listed substance during the reporting year. Also specify the average number of hours per day each process type was operated. (If only one or two operations are involved, list those.)

CBI

[ ]

	Days/Year	Average Hours/Day
Process Type #1 (The process type involving the largest quantity of the listed substance.)		
Manufactured		
Processed	2	6.5
Process Type #2 (The process type involving the 2nd largest quantity of the listed substance.)		
Manufactured		
Processed		
Process Type #3 (The process type involving the 3rd largest quantity of the listed substance.)		
Manufactured		
Processed		

2.10 State the maximum daily inventory and average monthly inventory of the listed substance that was stored on-site during the reporting year in the form of a bulk chemical.

CBI

[ ]

Maximum daily inventory		kg
Average monthly inventory		kg

[ ] Mark (X) this box if you attach a continuation sheet.

2.11 Related Product Types -- List any byproducts, coproducts, or impurities present with the listed substance in concentrations greater than 0.1 percent as it is manufactured, imported, or processed. The source of byproducts, coproducts, or impurities means the source from which the byproducts, coproducts, or impurities are made or introduced into the product (e.g., carryover from raw material, reaction product, etc.).

CBI

[ ]

CAS No.	Chemical Name	Byproduct, Coproduct or Impurity[1]	Concentration (%) (specify ± % precision)	Source of Byproducts, Coproducts, or Impurities
25791-96-2	polyethylene glycol	C*	17.2%± 0.1%	raw material*

[1]Use the following codes to designate byproduct, coproduct, or impurity:

B = Byproduct
C = Coproduct
I = Impurity

*TDI BLENDED WITH POLYOL TO MAKE SALEABLE PRODUCT.

[ ] Mark (X) this box if you attach a continuation sheet.

2.12 Existing Product Types -- List all existing product types which you manufactured, imported, or processed using the listed substance during the reporting year. List the quantity of listed substance you use for each product type as a percentage of the total volume of listed substance used during the reporting year. Also list the CBI quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to [ ] the instructions for further explanation and an example.)

a. Product Types[1]	b. % of Quantity Manufactured, Imported, or Processed	c. % of Quantity Used Captively On-Site	d. Type of End-Users[2]
X(URETHANE FOAM COMPONENT)	100%	0%	CM

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.13 Expected Product Types -- Identify all product types which you expect to manufacture, import, or process using the listed substance at any time after your current corporate fiscal year. For each use, specify the quantity you expect to manufacture, import, or process for each use as a percentage of the total volume of listed substance used during the reporting year. Also list the quantity of listed substance used captively on-site as a percentage of the value listed under column b., and the types of end-users for each product type. (Refer to the instructions for further explanation and an example.)

CBI

[ ]

a. Product Types[1]	b. % of Quantity Manufactured, Imported, or Processed	c. % of Quantity Used Captively On-Site	d. Type of End-Users[2]
X(URETHANE FOAM	100%	0%	CM
COMPONENT)			

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.14 CBI [ ] Final Product -- Complete the following table for each type of final product manufactured, imported, or processed at your facility that contains the listed substance other than as an impurity.

a. Product Type[1]	b. Final Product's Physical Form[2]	c. Average % Composition of Listed Substance in Final Product	d. Type of End-Users[3]
X(URETHANE FOAM COMPONENT)	B	82.8%	CM

[1]Use the following codes to designate product types:

A = Solvent
B = Synthetic reactant
C = Catalyst/Initiator/Accelerator/Sensitizer
D = Inhibitor/Stabilizer/Scavenger/Antioxidant
E = Analytical reagent
F = Chelator/Coagulant/Sequestrant
G = Cleanser/Detergent/Degreaser
H = Lubricant/Friction modifier/Antiwear agent
I = Surfactant/Emulsifier
J = Flame retardant
K = Coating/Binder/Adhesive and additives
L = Moldable/Castable/Rubber and additives
M = Plasticizer
N = Dye/Pigment/Colorant/Ink and additives
O = Photographic/Reprographic chemical and additives
P = Electrodeposition/Plating chemicals
Q = Fuel and fuel additives
R = Explosive chemicals and additives
S = Fragrance/Flavor chemicals
T = Pollution control chemicals
U = Functional fluids and additives
V = Metal alloy and additives
W = Rheological modifier
X = Other (specify) _____

[2]Use the following codes to designate the final product's physical form:

A = Gas
B = Liquid
C = Aqueous solution
D = Paste
E = Slurry
F1 = Powder
F2 = Crystalline solid
F3 = Granules
F4 = Other solid
G = Gel
H = Other (specify) _____

[3]Use the following codes to designate the type of end-users:

I = Industrial
CM = Commercial
CS = Consumer
H = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

2.15 Circle all applicable modes of transportation used to deliver bulk shipments of the CBI listed substance to off-site customers.

[ ] Truck 1

Railcar 2

Barge, Vessel 3

Pipeline 4

Plane 5

Other (specify) _____ 6

2.16 Customer Use -- Estimate the quantity of the listed substance used by your customers or prepared by your customers during the reporting year for use under each category CBI of end use listed (i-iv).

[ ]

Category of End Use

i. Industrial Products

Chemical or mixture ..... _____ kg/yr

Article ..... _____ kg/yr

ii. Commercial Products

Chemical or mixture ..... 4495 kg/yr

Article ..... _____ kg/yr

iii. Consumer Products

Chemical or mixture ..... _____ kg/yr

Article ..... _____ kg/yr

iv. Other

Distribution (excluding export) ..... _____ kg/yr

Export ..... _____ kg/yr

Quantity of substance consumed as reactant ..... _____ kg/yr

Unknown customer uses ..... _____ kg/yr

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 3 PROCESSOR RAW MATERIAL IDENTIFICATION

PART A GENERAL DATA

3.01 Specify the quantity purchased and the average price paid for the listed substance for each major source of supply listed. Product trades are treated as purchases.
CBI The average price is the market value of the product that was traded for the listed substance.
[ ]

Source of Supply	Quantity (kg)	Average Price ($/kg)
The listed substance was manufactured on-site.	0	
The listed substance was transferred from a different company site.	3628	$2.33/kg
The listed substance was purchased directly from a manufacturer or importer.	0	
The listed substance was purchased from a distributor or repackager.	0	
The listed substance was purchased from a mixture producer.	0	

3.02 Circle all applicable modes of transportation used to deliver the listed substance to
CBI your facility.

[ ]

(Truck) ..... (1)

Railcar 2

Barge, Vessel 3

Pipeline 4

Plane 5

Other (specify) _____ 6

[ ] Mark (X) this box if you attach a continuation sheet.

3.03 a. Circle all applicable containers used to transport the listed substance to your facility.

CBI

[ ]

Bags 1

Boxes 2

Free standing tank cylinders 3

Tank rail cars 4

Hopper cars 5

Tank trucks 6

Hopper trucks 7

Drums 8

Pipeline 9

Other (specify) _____ 10

N/A b. If the listed substance is transported in pressurized tank cylinders, tank rail cars, or tank trucks, state the pressure of the tanks.

Tank cylinders ..... _____ mmHg

Tank rail cars ..... _____ mmHg

Tank trucks ..... _____ mmHg

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RAW MATERIAL IN THE FORM OF A MIXTURE

N/A

3.04 If you obtain the listed substance in the form of a mixture, list the trade name(s) of the mixture, the name of its supplier(s) or manufacturer(s), an estimate of the average percent composition by weight of the listed substance in the mixture, and the amount of mixture processed during the reporting year.

CBI

[ ]

Trade Name	Supplier or Manufacturer	Average % Composition by Weight (specify ± % precision)	Amount Processed (kg/yr)

[ ] Mark (X) this box if you attach a continuation sheet.

PART C RAW MATERIAL VOLUME

3.05 CBI [ ] State the quantity of the listed substance used as a raw material during the reporting year in the form of a class I chemical, class II chemical, or polymer, and the percent composition, by weight, of the listed substance.

	Quantity Used (kg/yr)	% Composition by Weight of Listed Substance in Raw Material (specify ± % precision)
Class I chemical	4495	100%
Class II chemical		
Polymer		

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 4 PHYSICAL/CHEMICAL PROPERTIES

General Instructions:

If you are reporting on a mixture as defined in the glossary, reply to questions in Section 4 that are inappropriate to mixtures by stating "NA -- mixture."

For questions 4.06-4.15, if you possess any hazard warning statement, label, MSDS, or other notice that addresses the information requested, you may submit a copy or reasonable facsimile in lieu of answering those questions which it addresses.

PART A PHYSICAL/CHEMICAL DATA SUMMARY

4.01 Specify the percent purity for the three major[1] technical grade(s) of the listed substance as it is manufactured, imported, or processed. Measure the purity of the substance in the final product form for manufacturing activities, at the time you import the substance, or at the point you begin to process the substance.

CBI

[ ]

	Manufacture	Import	Process
Technical grade #1	_____ % purity	_____ % purity	100 % purity
Technical grade #2	_____ % purity	_____ % purity	N/A % purity
Technical grade #3	_____ % purity	_____ % purity	N/A % purity

[1]Major = Greatest quantity of listed substance manufactured, imported or processed.

4.02 Submit your most recently updated Material Safety Data Sheet (MSDS) for the listed substance, and for every formulation containing the listed substance. If you possess an MSDS that you developed and an MSDS developed by a different source, submit your version. Indicate whether at least one MSDS has been submitted by circling the appropriate response.

(Yes) ..... (1)

No 2

Indicate whether the MSDS was developed by your company or by a different source.

(Your company) ..... (1)

Another source 2

[ ] Mark (X) this box if you attach a continuation sheet.

4.03 Submit a copy or reasonable facsimile of any hazard information (other than an MSDS) that is provided to your customers/users regarding the listed substance or any formulation containing the listed substance. Indicate whether this information has been submitted by circling the appropriate response.

Yes 1

(No) ..... (2)

4.04 For each activity that uses the listed substance, circle all the applicable number(s) corresponding to each physical state of the listed substance during the activity listed. Physical states for importing and processing activities are determined at the time you import or begin to process the listed substance. Physical states for manufacturing, storage, disposal and transport activities are determined using the final state of the product.

CBI

[ ]

	Physical State				
Activity	Solid	Slurry	Liquid	Liquified Gas	Gas
Manufacture	1	2	3	4	5
Import	1	2	3	4	5
Process	1	2	(3)	4	5
Store	1	2	(3)	4	5
Dispose	1	2	3	4	5
Transport	1	2	(3)	4	5

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 4.05 Particle Size -- If the listed substance exists in particulate form during any of the following activities, indicate for each applicable physical state the size and the percentage distribution of the listed substance by activity. Do not include particles ≥10 microns in diameter. Measure the physical state and particle sizes for importing and processing activities at the time you import or begin to process the listed substance. Measure the physical state and particle sizes for manufacturing storage, disposal and transport activities using the final state of the product.

CBI

[ ]

Physical State		Manufacture	Import	Process	Store	Dispose	Transport
Dust	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Powder	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Fiber	<1 micron						
	1 to <5 microns						
	5 to <10 microns						
Aerosol	<1 micron						
	1 to <5 microns						
	5 to <10 microns						

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 5 ENVIRONMENTAL FATE

PART A RATE CONSTANTS AND TRANSFORMATION PRODUCTS

UNK 5.01 Indicate the rate constants for the following transformation processes.

a. Photolysis:

Absorption spectrum coefficient (peak) .... _____ (1/M cm) at _____ nm

Reaction quantum yield, ϕ ..... _____ at _____ nm

Direct photolysis rate constant, k_p, at ... _____ 1/hr _____ latitude

b. Oxidation constants at 25°C:

For $^1O_2$ (singlet oxygen), k_{ox} ..... _____ 1/M hr

For RO_2 (peroxy radical), k_{ox} ..... _____ 1/M hr

c. Five-day biochemical oxygen demand, BOD_5 ... _____ mg/l

d. Biotransformation rate constant:

For bacterial transformation in water, k_b... _____ 1/hr

Specify culture ..... _____

e. Hydrolysis rate constants:

For base-promoted process, k_B ..... _____ 1/M hr

For acid-promoted process, k_A ..... _____ 1/M hr

For neutral process, k_N ..... _____ 1/hr

f. Chemical reduction rate (specify conditions) _____

_____

g. Other (such as spontaneous degradation) ... _____

_____

[ ] Mark (X) this box if you attach a continuation sheet.

PART B PARTITION COEFFICIENTS

UNK 5.02 a. Specify the half-life of the listed substance in the following media.

Media	Half-life (specify units)
Groundwater	
Atmosphere	
Surface water	
Soil	

b. Identify the listed substance's known transformation products that have a half-life greater than 24 hours.

CAS No.	Name	Half-life (specify units)	Media
			in
			in
			in
			in

UNK 5.03 Specify the octanol-water partition coefficient, K_{ow} ... _____ at 25°C

Method of calculation or determination ..... _____

UNK 5.04 Specify the soil-water partition coefficient, K_d ..... _____ at 25°C

Soil type ..... _____

UNK 5.05 Specify the organic carbon-water partition coefficient, K_{oc} ..... _____ at 25°C

UNK 5.06 Specify the Henry's Law Constant, H ..... _____ atm-m^3/mole

[ ] Mark (X) this box if you attach a continuation sheet.

UNK 5.07 List the bioconcentration factor (BCF) of the listed substance, the species for which it was determined, and the type of test used in deriving the BCF.

Bioconcentration Factor	Species	Test[1]

[1]Use the following codes to designate the type of test:

F = Flowthrough
S = Static

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 6.04 For each market listed below, state the quantity sold and the total sales value of
CBI the listed substance sold or transferred in bulk during the reporting year.

[ ]

Market	Quantity Sold or Transferred (kg/yr)	Total Sales Value ($/yr)
Retail sales		
Distribution -- Wholesalers		
Distribution -- Retailers		
Intra-company transfer		
Repackagers		
Mixture producers		
Article producers		
Other chemical manufacturers or processors		
Exporters		
Other (specify)		
_____		

6.05 Substitutes -- List all known commercially feasible substitutes that you know exist for the listed substance and state the cost of each substitute. A commercially feasible substitute is one which is economically and technologically feasible to use
CBI in your current operation, and which results in a final product with comparable performance in its end uses.

[ ]

Substitute	Cost ($/kg)
diphenylmethane diisocyanurate	$2.00/kg

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 7 MANUFACTURING AND PROCESSING INFORMATION

General Instructions:

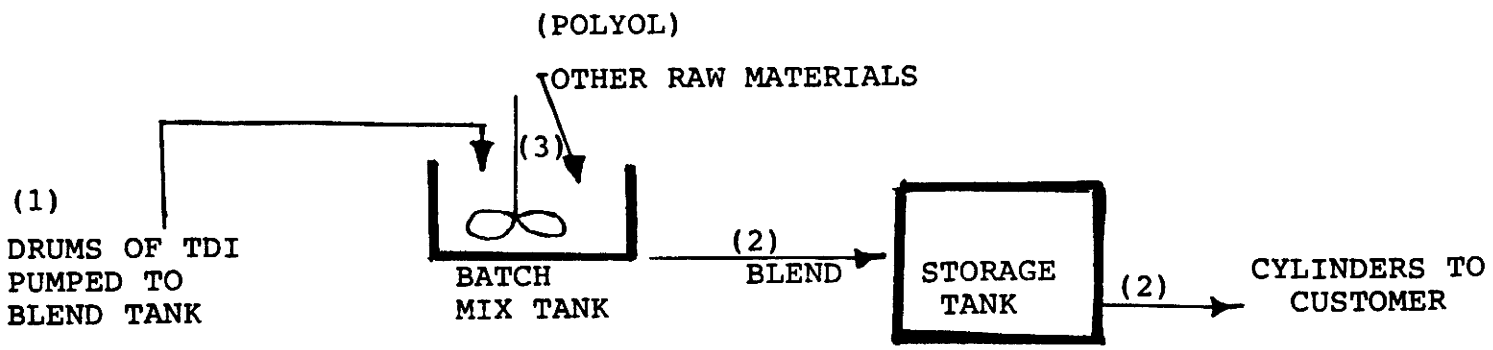
For questions 7.04-7.06, provide a separate response for each process block flow diagram provided in questions 7.01, 7.02, and 7.03. Identify the process type from which the information is extracted.

PART A MANUFACTURING AND PROCESSING PROCESS TYPE DESCRIPTION

7.01 In accordance with the instructions, provide a process block flow diagram showing the major (greatest volume) process type involving the listed substance.

CBI

[ ] Process type ..... _____

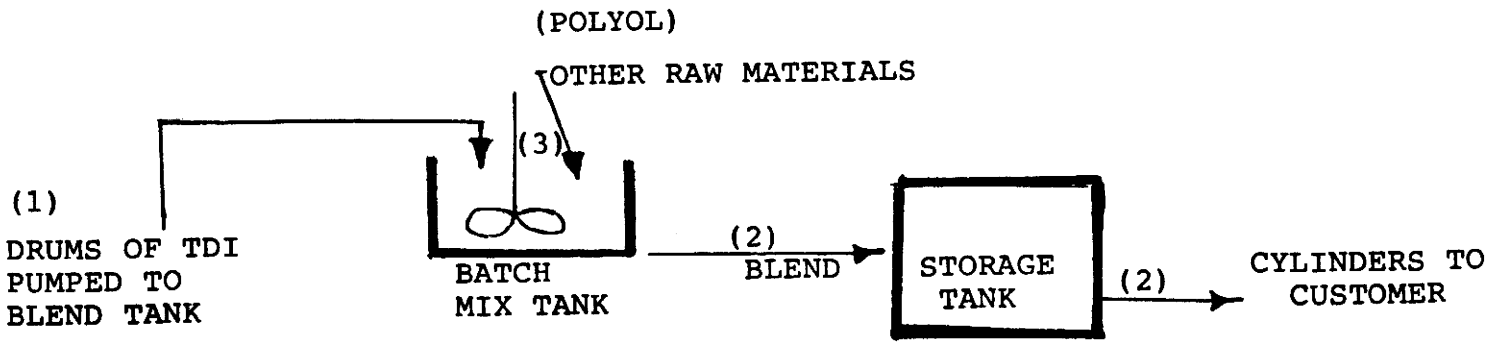


[ ] Mark (X) this box if you attach a continuation sheet.

7.03 In accordance with the instructions, provide a process block flow diagram showing all process emission streams and emission points that contain the listed substance and which, if combined, would total at least 90 percent of all facility emissions if not treated before emission into the environment. If all such emissions are released from one process type, provide a process block flow diagram using the instructions for question 7.01. If all such emissions are released from more than one process type, provide a process block flow diagram showing each process type as a separate block.

CBI

[ ] Process type ..... _____



[ ] Mark (X) this box if you attach a continuation sheet.

7.04 Describe the typical equipment types for each unit operation identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Unit Operation ID Number	Typical Equipment Type	Operating Temperature Range (°C)	Operating Pressure Range (mm Hg)	Vessel Composition
1	BATCH MIX TANK	AMBIENT	AMBIENT	SAME AS PRODUCT 82.8%TDI 17.2%POLYOL

[ ] Mark (X) this box if you attach a continuation sheet.

7.05 Describe each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Process Stream ID Code	Process Stream Description	Physical State[1]	Stream Flow (kg/yr)
1	TDI LIQUID	OL	342
3	POLYOL	OL	747 kg

[1]Use the following codes to designate the physical state for each process stream:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[ ] Mark (X) this box if you attach a continuation sheet.

7.06 Characterize each process stream identified in your process block flow diagram(s). If a process block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the CBI instructions for further explanation and an example.)

[ ] Process type ..... _____

a. Process Stream ID Code	b. Known Compounds[1]	c. Concentrations[2,3] (% or ppm)	d. Other Expected Compounds	e. Estimated Concentrations (% or ppm)
1	TDI	100	N/A	N/A
2	TDI	82.8%	NONE	
	POLYOL	17.2%	NONE	
3	POLYOL	100%	NONE	

7.06 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

7.06 (continued)

[1]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column b. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1		
2		
3		
4		
5		

[2]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

[3]Use the following codes to designate how the concentration was measured:

V = Volume
W = Weight

[ ] Mark (X) this box if you attach a continuation sheet.

PART A RESIDUAL TREATMENT PROCESS DESCRIPTION

N/A 8.01 In accordance with the instructions, provide a residual treatment block flow diagram which describes the treatment process used for residuals identified in question 7.01.

CBI

[ ] Process type ..... _____

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RESIDUAL GENERATION AND CHARACTERIZATION

N/A 8.05 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process
CBI type. (Refer to the instructions for further explanation and an example.)

[ ] Process type .....

a. Stream ID Code	b. Type of Hazardous Waste[1]	c. Physical State of Residual[2]	d. Known Compounds[3]	e. Concentrations (% or ppm)[4,5,6]	f. Other Expected Compounds	g. Estimated Concentrations (% or ppm)

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[1]Use the following codes to designate the type of hazardous waste:

I = Ignitable
C = Corrosive
R = Reactive
E = EP toxic
T = Toxic
H = Acutely hazardous

[2]Use the following codes to designate the physical state of the residual:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[3]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component. Assign an additive package number to each additive package and list this number in column d. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1		
2		
3		
4		
5		

[4]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[3]For each additive package introduced into a process stream, specify the compounds that are present in each additive package, and the concentration of each component Assign an additive package number to each additive package and list this number in column d. (Refer to the instructions for further explanation and an example. Refer to the glossary for the definition of additive package.)

Additive Package Number	Components of Additive Package	Concentrations (% or ppm)
1		
2		
3		
4		
5		

[4]Use the following codes to designate how the concentration was determined:

A = Analytical result
E = Engineering judgement/calculation

8.05 continued below

[ ] Mark (X) this box if you attach a continuation sheet.

8.05 (continued)

[5]Use the following codes to designate how the concentration was measured:

V = Volume
W = Weight

[6]Specify the analytical test methods used and their detection limits in the table below. Assign a code to each test method used and list those codes in column e.

Code	Method	Detection Limit (± ug/l)
1		
2		
3		
4		
5		
6		

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 8.06 Characterize each process stream identified in your residual treatment block flow diagram(s). If a residual treatment block flow diagram is provided for more than one process type, photocopy this question and complete it separately for each process type. (Refer to the instructions for further explanation and an example.)

CBI

[ ] Process type ..... _____

a. Stream ID Code	b. Waste Description Code[1]	c. Management Method Code[2]	d. Residual Quantities (kg/yr)	e. Management of Residual (%) On-Site	e. Management of Residual (%) Off-Site	f. Costs for Off-Site Management (per kg)	g. Changes in Management Methods

[1]Use the codes provided in Exhibit 8-1 to designate the waste descriptions

[2]Use the codes provided in Exhibit 8-2 to designate the management methods

[ ] Mark (X) this box if you attach a continuation sheet.

8.22 Describe the combustion chamber design parameters for each of the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual treatment block flow diagram(s).

CBI

[ ]

Incinerator	Combustion Chamber Temperature (°C)		Location of Temperature Monitor		Residence Time In Combustion Chamber (seconds)	
	Primary	Secondary	Primary	Secondary	Primary	Secondary
1						
2						
3						

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes 1

No 2

N/A 8.23 Complete the following table for the three largest (by capacity) incinerators that are used on-site to burn the residuals identified in your process block or residual treatment block flow diagram(s).

CBI

[ ]

Incinerator	Air Pollution Control Device[1]	Types of Emissions Data Available
1		
2		
3		

Indicate if Office of Solid Waste survey has been submitted in lieu of response by circling the appropriate response.

Yes 1

No 2

---

[1] Use the following codes to designate the air pollution control device:

S = Scrubber (include type of scrubber in parenthesis)
E = Electrostatic precipitator
O = Other (specify) _____

[ ] Mark (X) this box if you attach a continuation sheet.

PART A EMPLOYMENT AND POTENTIAL EXPOSURE PROFILE

9.01 Mark (X) the appropriate column to indicate whether your company maintains records on the following data elements for hourly and salaried workers. Specify for each data element the year in which you began maintaining records and the number of years the records for that data element are maintained. (Refer to the instructions for further explanation and an example.)

CBI

[ ]

Data Element	Data are Maintained for: Hourly Workers	Data are Maintained for: Salaried Workers	Year in Which Data Collection Began	Number of Years Records Are Maintained
Date of hire	X	X	1966	Employment Plus 1 Year
Age at hire	X	X	"	
Work history of individual before employment at your facility	X	X	"	"
Sex	X	X	"	"
Race	X	X	"	"
Job titles	X	X	"	"
Start date for each job title	X	X	"	"
End date for each job title	X	X	"	"
Work area industrial hygiene monitoring data	X	X	"	"
Personal employee monitoring data	X	X	"	"
Employee medical history	X	X	"	"
Employee smoking history	X	X	"	"
Accident history	X	X	"	"
Retirement date	X	X	"	"
Termination date	X	X	"	"
Vital status of retirees				
Cause of death data				

[ ] Mark (X) this box if you attach a continuation sheet.

9.02 In accordance with the instructions, complete the following table for each activity in which you engage.

CBI

[ ]

a. Activity	b. Process Category	c. Yearly Quantity (kg)	d. Total Workers	e. Total Worker-Hours
Manufacture of the listed substance	Enclosed	N/A		
	Controlled Release	"		
	Open	"		
On-site use as reactant	Enclosed	"		
	Controlled Release	"		
	Open	"		
On-site use as nonreactant	Enclosed	"		
	Controlled Release	"		
	Open	"		
On-site preparation of products	Enclosed	"		
	Controlled Release	< 2.0	10	130
	Open	N/A		

[ ] Mark (X) this box if you attach a continuation sheet.

9.03 Provide a descriptive job title for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance.

CBI

[ ]

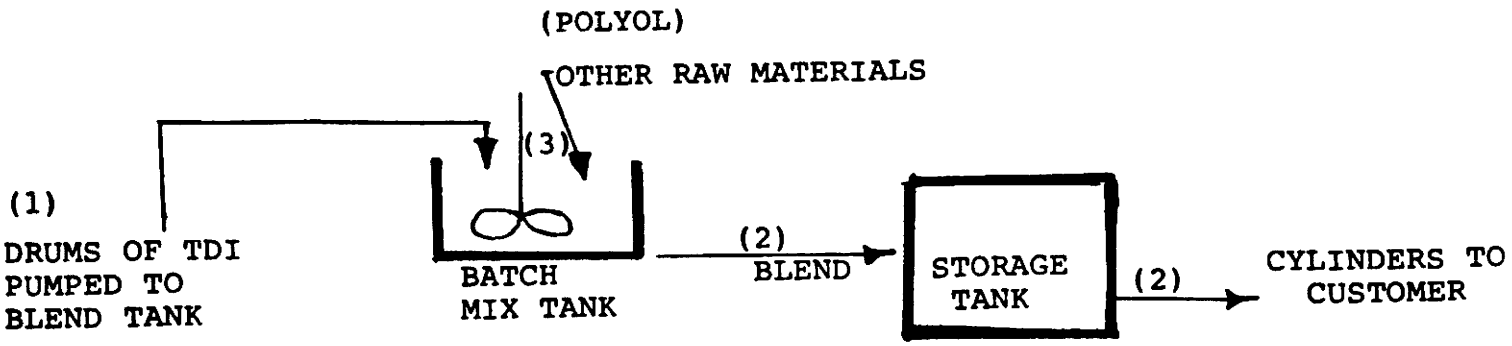
Labor Category	Descriptive Job Title
A	HOURLY OPERATOR
B	HOURLY OPERATOR ASSISTANT
C	HOURLY OPERATOR TRAINEE
D	MAINTENANCE LEAD MAN
E	MAINTENANCE TECHNICIAN A
F	SHIFT SUPERVISOR
G	PRODUCTION SUPERINTENDANT
H	
I	
J	

[ ] Mark (X) this box if you attach a continuation sheet.

9.04 In accordance with the instructions, provide your process block flow diagram(s) and indicate associated work areas.

CBI

[ ] Process type ..... _____



NOTE: Worker exposure may occur only in batch mix tank area. Product is packaged in pressurized cylinders-no exposure during packaging.

[ ] Mark (X) this box if you attach a continuation sheet.

9.05 Describe the various work area(s) shown in question 9.04 that encompass workers who may potentially come in contact with or be exposed to the listed substance. Add any additional areas not shown in the process block flow diagram in question 7.01 or 7.02. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... BATCH MIX AREA

Work Area ID	Description of Work Areas and Worker Activities
1	BATCH MIX AREA - BLEND RAW MATERIALS
2	AND FILL PRODUCT DRUMS
3	
4	
5	
6	
7	
8	
9	
10	

[ ] Mark (X) this box if you attach a continuation sheet.

9.06 Complete the following table for each work area identified in question 9.05, and for each labor category at your facility that encompasses workers who may potentially come in contact with or be exposed to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... BATCH MIX AREA

Work area ..... BLEND TANK

Labor Category	Number of Workers Exposed	Mode of Exposure (e.g., direct skin contact)	Physical State of Listed Substance[1]	Average Length of Exposure Per Day[2]	*Number of Days per Year Exposed
A	2	INHALATION OF VAPOR	OL	E	2
B	3	"	"	E	2
C	1	"	"	E	2
D	1	"	"	C	2
E	1	"	"	C	2
F	1	"	"	A	2
G	1	"	"	A	2

*For 1988 only handled for two days.

[1]Use the following codes to designate the physical state of the listed substance at the point of exposure:

GC = Gas (condensible at ambient temperature and pressure)
GU = Gas (uncondensible at ambient temperature and pressure; includes fumes, vapors, etc.)
SO = Solid
SY = Sludge or slurry
AL = Aqueous liquid
OL = Organic liquid
IL = Immiscible liquid (specify phases, e.g., 90% water, 10% toluene)

[2]Use the following codes to designate average length of exposure per day:

A = 15 minutes or less
B = Greater than 15 minutes, but not exceeding 1 hour
C = Greater than one hour, but not exceeding 2 hours
D = Greater than 2 hours, but not exceeding 4 hours
E = Greater than 4 hours, but not exceeding 8 hours
F = Greater than 8 hours

[ ] Mark (X) this box if you attach a continuation sheet.

9.07 For each labor category represented in question 9.06, indicate the 8-hour Time Weighted Average (TWA) exposure levels and the 15-minute peak exposure levels. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... TDI BLENDING PROCESS

Work area ..... AT BLENDER

Labor Category	8-hour TWA Exposure Level (ppm, mg/m^3, other-specify)	15-Minute Peak Exposure Level (ppm, mg/m^3, other-specify)
A		Greater than 0.08 ppm*

[ ] Mark (X) this box if you attach a continuation sheet.

PART B WORK PLACE MONITORING PROGRAM

9.08 If you monitor worker exposure to the listed substance, complete the following table.

CBI

[ ]

Sample/Test	Work Area ID	Testing Frequency (per year)	Number of Samples (per test)	Who Samples[1]	Analyzed In-House (Y/N)	Number of Years Records Maintained
Personal breathing zone	BLENDING	during visit when TDI used	Continual Tape Monitoring	D	Y	30+
General work area (air)	STORAGE	Some IH visits	"	D	Y	30+
Wipe samples						
Adhesive patches						
Blood samples						
Urine samples						
Respiratory samples	(Medical Dept Question)					
Allergy tests	"	"	"			
Other (specify)						
Other (specify)						
Other (specify)						

[1]Use the following codes to designate who takes the monitoring samples:

A = Plant industrial hygienist
B = Insurance carrier
C = OSHA consultant
D = Other (specify) Corporate Industrial Hygiene

[ ] Mark (X) this box if you attach a continuation sheet.

9.09 For each sample type identified in question 9.08, describe the type of sampling and analytical methodology used for each type of sample.

CBI

[ ]	Sample Type	Sampling and Analytical Methodology
1)	color change tape	change of color measured by densitometer
2)	Marceli	change of color solution read by spectrophotometer

9.10 If you conduct personal and/or ambient air monitoring for the listed substance, specify the following information for each equipment type used.

CBI

[ ]	Equipment Type[1]	Detection Limit[2]	Manufacturer	Averaging Time (hr)	Model Number
1)	D color change tape	.002 A	MDA	8+	MCM 4000
				~~sample~~	~~MSA Model G~~
2)	air pump & impinger	.001 A	MSA/Ace Glass	time	glass-midget ~~impinger~~

[1]Use the following codes to designate personal air monitoring equipment types:

A = Passive dosimeter
B = Detector tube
C = Charcoal filtration tube with pump
D = Other (specify) _____

Use the following codes to designate ambient air monitoring equipment types:

E = Stationary monitors located within work area
F = Stationary monitors located within facility
G = Stationary monitors located at plant boundary
H = Mobile monitoring equipment (specify) _____
I = Other (specify) _____

[2]Use the following codes to designate detection limit units:

A = ppm
B = Fibers/cubic centimeter (f/cc)
C = Micrograms/cubic meter (μ/m^3)

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 9.11 If you conduct routine medical tests for monitoring the health effects of exposure to the listed substance, specify the type and frequency of the tests.

CBI

[ ]	Test Description	Frequency (weekly, monthly, yearly, etc.)

[ ] Mark (X) this box if you attach a continuation sheet.

PART C ENGINEERING CONTROLS

9.12 Describe the engineering controls that you use to reduce or eliminate worker exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... URETHANE FOAM COMPONENT

Work area ..... BATCH MIX AREA

Engineering Controls	Used (Y/N)	Year Installed	Upgraded (Y/N)	Year Upgraded
Ventilation:				
Local exhaust	Y	1966	N	
General dilution	Y	1966	N	
Other (specify)				
Vessel emission controls	Y	1966	N	
Mechanical loading or packaging equipment				
Other (specify)				

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 9.13 **Describe all equipment or process modifications you have made within the 3 years prior to the reporting year that have resulted in a reduction of worker exposure to the listed substance. For each equipment or process modification described, state the percentage reduction in exposure that resulted. Photocopy this question and complete it separately for each process type and work area.**

CBI

[ ] Process type ..... _____

Work area ..... _____

Equipment or Process Modification	Reduction in Worker Exposure Per Year (%)

[ ] Mark (X) this box if you attach a continuation sheet.

PART D PERSONAL PROTECTIVE AND SAFETY EQUIPMENT

9.14 Describe the personal protective and safety equipment that your workers wear or use in each work area in order to reduce or eliminate their exposure to the listed substance. Photocopy this question and complete it separately for each process type and work area.

CBI

[ ] Process type ..... BATCH MIX AREA

Work area ..... BLEND TANK

Equipment Types	Wear or Use (Y/N)
Respirators	N
Safety goggles/glasses	Y
Face shields	Y
Coveralls	N
Bib aprons	N
Chemical-resistant gloves	Y
Other (specify)	
Hardhats	Y

[ ] Mark (X) this box if you attach a continuation sheet.

9.15 If workers use respirators when working with the listed substance, specify for each process type, the work areas where the respirators are used, the type of respirators used, the average usage, whether or not the respirators were fit tested, and the type and frequency of the fit tests. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... BATCH MIX AREA

Work Area	Respirator Type	Average Usage[1]	Fit Tested (Y/N)	Type of Fit Test[2]	Frequency of Fit Tests (per year)

[1]Use the following codes to designate average usage:

A = Daily
B = Weekly
C = Monthly
D = Once a year
E = Other (specify) _____

[2]Use the following codes to designate the type of fit test:

QL = Qualitative
QT = Quantitative

Workers do not use respirator unless there is an emergency.

[ ] Mark (X) this box if you attach a continuation sheet.

PART E WORK PRACTICES

9.19 Describe all of the work practices and administrative controls used to reduce or eliminate worker exposure to the listed substance (e.g., restrict entrance only to authorized workers, mark areas with warning signs, insure worker detection and monitoring practices, provide worker training programs, etc.). Photocopy this CBI question and complete it separately for each process type and work area.

[ ]

Process type ..... URETHANE FOAM COMPONENTS

Work area ..... BATCH MIX AREA

1) RESTRICTED ENTRANCE

2) PERSONNEL PROTECTIVE EQUIPMENT

3) JOB TRAINING

4) SAFETY TRAINING

5) HAZCOM TRAINING

9.20 Indicate (X) how often you perform each housekeeping task used to clean up routine leaks or spills of the listed substance. Photocopy this question and complete it separately for each process type and work area.

Process type ..... URETHANE FOAM COMPONENT

Work area ..... BATCH MIX AREA

Housekeeping Tasks	Less Than Once Per Day	1-2 Times Per Day	3-4 Times Per Day	More Than 4 Times Per Day
Sweeping			X	
Vacuuming	X			
Water flushing of floors	X			
Other (specify)				
*				

*IMMEDIATELY CLEAN UP ALL SPILLS BY COLLECTION AND PUMPING TO STORAGE OR DRUMS OR USE OF ABSORBANTS WHICH ARE THEN IMMEDIATELY CLEANED UP.

[ ] Mark (X) this box if you attach a continuation sheet.

9.21 Do you have a written medical action plan for responding to routine or emergency exposure to the listed substance?

Routine exposure

Yes 1

No 2

Emergency exposure

Yes 1

No 2

If yes, where are copies of the plan maintained?

Routine exposure: _____

Emergency exposure: _____

9.22 Do you have a written leak and spill cleanup plan that addresses the listed substance? Circle the appropriate response.

(Yes) ..... (1)

No 2

If yes, where are copies of the plan maintained? Technical Mgr./Control Room Supervisors

Has this plan been coordinated with state or local government response organizations? Circle the appropriate response.

(Yes) ..... (1)

No 2

9.23 Who is responsible for monitoring worker safety at your facility? Circle the appropriate response.

Plant safety specialist 1

Insurance carrier 2

OSHA consultant 3

Other (specify) _____ 4

[ ] Mark (X) this box if you attach a continuation sheet.

SECTION 10 ENVIRONMENTAL RELEASE

General Instructions:

Complete Part E (questions 10.23-10.35) for each non-routine release involving the listed substance that occurred during the reporting year. Report on all releases that are equal to or greater than the listed substance's reportable quantity value, RQ, unless the release is federally permitted as defined in 42 U.S.C. 9601, or is specifically excluded under the definition of release as defined in 40 CFR 302.3(22). Reportable quantities are codified in 40 CFR Part 302. If the listed substance is not a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and, thus, does not have an RQ, then report releases that exceed 2,270 kg. If such a substance however, is designated as a CERCLA hazardous substance, then report those releases that are equal to or greater than the RQ. The facility may have answered these questions or similar questions under the Agency's Accidental Release Information Program and may already have this information readily available. Assign a number to each release and use this number throughout this part to identify the release. Releases over more than a 24-hour period are not single releases, i.e., the release of a chemical substance equal to or greater than an RQ must be reported as a separate release for each 24-hour period the release exceeds the RQ.

For questions 10.25-10.35, answer the questions for each release identified in question 10.23. Photocopy these questions and complete them separately for each release.

PART A GENERAL INFORMATION

10.01 Where is your facility located? Circle all appropriate responses.

CBI

[ ] Industrial area ..... (1)

Urban area 2

Residential area 3

Agricultural area 4

Rural area 5

Adjacent to a park or a recreational area 6

Within 1 mile of a navigable waterway 7

Within 1 mile of a school, university, hospital, or nursing home facility 8

Within 1 mile of a non-navigable waterway 9

Other (specify) _____ 10

[ ] Mark (X) this box if you attach a continuation sheet.

10.02 Specify the exact location of your facility (from central point where process unit is located) in terms of latitude and longitude or Universal Transverse Mercader (UTM) coordinates.

Latitude ..... 81 ° 50 ' 30 "

Longitude ..... 41 ° 23 ' 30 "

UTM coordinates ..... Zone _____, Northing _____, Easting _____

10.03 If you monitor meteorological conditions in the vicinity of your facility, provide the following information.

Average annual precipitation ..... _____ inches/year

Predominant wind direction ..... _____

10.04 Indicate the depth to groundwater below your facility.

Depth to groundwater ..... _____ meters

10.05 For each on-site activity listed, indicate (Y/N/NA) all routine releases of the listed substance to the environment. (Refer to the instructions for a definition of Y, N, and NA.)

CBI

[_]

On-Site Activity	Environmental Release		
	Air	Water	Land
Manufacturing			
Importing			
Processing	X		
Otherwise used			
Product or residual storage			
Disposal			
Transport			

[_] Mark (X) this box if you attach a continuation sheet.

N/A 10.08 Describe the control technologies used to minimize release of the listed substance for each process stream containing the listed substance as identified in your process block or residual treatment block flow diagram(s). Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Stream ID Code	Control Technology	Percent Efficiency

[ ] Mark (X) this box if you attach a continuation sheet.

PART B RELEASE TO AIR

10.09 Point Source Emissions -- Identify each emission point source containing the listed substance in terms of a Stream ID Code as identified in your process block or residual treatment block flow diagram(s), and provide a description of each point source. Do not include raw material and product storage vents, or fugitive emission sources (e.g., equipment leaks). Photocopy this question and complete it separately for each process type.

CBI
[ ]

Process type ..... _____

Point Source ID Code	Description of Emission Point Source
1	General ventilation system

[ ] Mark (X) this box if you attach a continuation sheet.

[ ] Mark (X) this box if you attach a continuation sheet.

10.10 Emission Characteristics - - Characterize the emissions for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

[ ]

Point Source ID Code	Physical State[1]	Average Emissions (kg/day)	Frequency[2] (days/yr)	Duration[3] (min/day)	Average Emission Factor[4]	Maximum Emission Rate (kg/min)	Maximum Emission Rate Frequency (events/yr)	Maximum Emission Rate Duration (min/event)
1	6	< 1	5	480	0.001	0.0001	5	480

[1]Use the following codes to designate physical state at the point of release:
G = Gas; V = Vapor; P = Particulate; A = Aerosol; O = Other (specify) _____

[2]Frequency of emission at any level of emission

[3]Duration of emission at any level of emission

[4]Average Emission Factor — Provide estimated (± 25 percent) emission factor (kg of emission per kg of production of listed substance)

10.11 Stack Parameters -- Identify the stack parameters for each Point Source ID Code identified in question 10.09 by completing the following table.

CBI

[ ]

Point Source ID Code	Stack Height(m)	Stack Inner Diameter (at outlet) (m)	Exhaust Temperature (°C)	Emission Exit Velocity (m/sec)	Building Height(m)[1]	Building Width(m)[2]	Vent Type[3]
1	35'	10"	Ambient		30'	50m	V

[1]Height of attached or adjacent building

[2]Width of attached or adjacent building

[3]Use the following codes to designate vent type:

H = Horizontal
V = Vertical

[ ] Mark (X) this box if you attach a continuation sheet.

N/A 10.12 If the listed substance is emitted in particulate form, indicate the particle size distribution for each Point Source ID Code identified in question 10.09. Photocopy this question and complete it separately for each emission point source.

CBI

[ ]

Point source ID code ..... _____

Size Range (microns)	Mass Fraction (% ± % precision)
< 1	
≥ 1 to < 10	
≥ 10 to < 30	
≥ 30 to < 50	
≥ 50 to < 100	
≥ 100 to < 500	
≥ 500	

Total = 100%

[ ] Mark (X) this box if you attach a continuation sheet.

PART C FUGITIVE EMISSIONS

10.13 Equipment Leaks -- Complete the following table by providing the number of equipment types listed which are exposed to the listed substance and which are in service according to the specified weight percent of the listed substance passing through the component. Do this for each process type identified in your process block or residual treatment block flow diagram(s). Do not include equipment types that are not exposed to the listed substance. If this is a batch or intermittently operated process, give an overall percentage of time per year that the process type is exposed to the listed substance. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... URETHANE FOAM COMPONENTS

Percentage of time per year that the listed substance is exposed to this process type ..... ____%

Equipment Type	Number of Components in Service by Weight Percent of Listed Substance in Process Stream					
	Less than 5%	5-10%	11-25%	26-75%	76-99%	Greater than 99%
Pump seals[1]						
Packed						2
Mechanical						
Double mechanical[2]						
Compressor seals[1]						0
Flanges						20
Valves						
Gas[3]						0
Liquid						5
Pressure relief devices[4] (Gas or vapor only)						0
Sample connections						
Gas						0
Liquid						2
Open-ended lines[5] (e.g., purge, vent)						
Gas						0
Liquid						0

[1]List the number of pump and compressor seals, rather than the number of pumps or compressors

10.13 continued on next page

[ ] Mark (X) this box if you attach a continuation sheet.

10.13 (continued)

[2]If double mechanical seals are operated with the barrier (B) fluid at a pressure greater than the pump stuffing box pressure and/or equipped with a sensor (S) that will detect failure of the seal system, the barrier fluid system, or both, indicate with a "B" and/or an "S", respectively

[3]Conditions existing in the valve during normal operation

[4]Report all pressure relief devices in service, including those equipped with control devices

[5]Lines closed during normal operation that would be used during maintenance operations

---

N/A 10.14 Pressure Relief Devices with Controls -- Complete the following table for those pressure relief devices identified in 10.13 to indicate which pressure relief devices in service are controlled. If a pressure relief device is not controlled, enter "None" under column c.

CBI

[ ]

a. Number of Pressure Relief Devices	b. Percent Chemical in Vessel[1]	c. Control Device	d. Estimated Control Efficiency[2]

[1]Refer to the table in question 10.13 and record the percent range given under the heading entitled "Number of Components in Service by Weight Percent of Listed Substance" (e.g., <5%, 5-10%, 11-25%, etc.)

[2]The EPA assigns a control efficiency of 100 percent for equipment leaks controlled with rupture discs under normal operating conditions. The EPA assigns a control efficiency of 98 percent for emissions routed to a flare under normal operating conditions

---

[ ] Mark (X) this box if you attach a continuation sheet.

10.15 Equipment Leak Detection -- If a formal leak detection and repair program is in place, complete the following table regarding those leak detection and repair procedures. Photocopy this question and complete it separately for each process type.

CBI

[ ] Process type ..... _____

Equipment Type	Leak Detection Concentration (ppm or mg/m^3) Measured at ____ Inches from Source	Detection Device[1]	Frequency of Leak Detection (per year)	Repairs Initiated (days after detection)	Repairs Completed (days after initiated)
Pump seals			Minimum		
Packed		0	Once/8 Hr. Shift	1	1
Mechanical					
Double mechanical					
Compressor seals		N/A			
Flanges		0	"	1	1
Valves					
Gas		N/A			
Liquid		0	"	1	1
Pressure relief devices (gas or vapor only)		N/A			
Sample connections					
Gas		N/A			
Liquid		0	"	1	1
Open-ended lines					
Gas		N/A			
Liquid		N/A			

[1]Use the following codes to designate detection device:

POVA = Portable organic vapor analyzer
FPM = Fixed point monitoring
O = Other (specify) visual inspection

[ ] Mark (X) this box if you attach a continuation sheet.

N/A (DRUMS)

10.16 Raw Material, Intermediate and Product Storage Emissions - - Complete the following table by providing the information on each liquid raw material, intermediate, and product storage vessel containing the listed substance as identified in your process block or residual treatment block flow diagram(s).

CBI

[ ]

Vessel Type[1]	Floating Roof Seals[2]	Composition of Stored Materials[3]	Throughput (liters per year)	Vessel Filling Rate (gpm)	Vessel Filling Duration (min)	Vessel Inner Diameter (m)	Vessel Height (m)	Operating Vessel Volume (l)	Vessel Emission Controls[4]	Design Flow Rate[5]	Vent Diameter (cm)	Control Efficiency (%)	Basis for Estimate[6]

[1]Use the following codes to designate vessel type:

F = Fixed roof
CIF = Contact internal floating roof
NCIF = Noncontact internal floating roof
EFR = External floating roof
P = Pressure vessel (indicate pressure rating)
H = Horizontal
U = Underground

[2]Use the following codes to designate floating roof seals:

MS1 = Mechanical shoe, primary
MS2 = Shoe-mounted secondary
MS2R = Rim-mounted, secondary
LM1 = Liquid-mounted resilient filled seal, primary
LM2 = Rim-mounted shield
LMW = Weather shield
VM1 = Vapor mounted resilient filled seal, primary
VM2 = Rim-mounted secondary
VMW = Weather shield

[3]Indicate weight percent of the listed substance. Include the total volatile organic content in parenthesis

[4]Other than floating roofs

[5]Gas/vapor flow rate the emission control device was designed to handle (specify flow rate units)

[6]Use the following codes to designate basis for estimate of control efficiency:

C = Calculations
S = Sampling

[ ] Mark (X) this box if you attach a continuation sheet.

PART E NON-ROUTINE RELEASES

N/A 10.23 Indicate the date and time when the release occurred and when the release ceased or was stopped. If there were more than six releases, attach a continuation sheet and list all releases.

Release	Date Started	Time (am/pm)	Date Stopped	Time (am/pm)
1				
2				
3				
4				
5				
6				

N/A 10.24 Specify the weather conditions at the time of each release.

Release	Wind Speed (km/hr)	Wind Direction	Humidity (%)	Temperature (°C)	Precipitation (Y/N)
1					
2					
3					
4					
5					
6					

[ ] Mark (X) this box if you attach a continuation sheet.

TOLUENE DIISOCYANATE

Olin CHEMICALS

INTRODUCTION

Olin toluene diisocyanate (TDI) is produced at Lake Charles, LA. The plant has a capacity approaching 200 million pounds annually.

Olin's position as a TDI supplier is particularly strong because it is one of the few manufacturers independent of outside sources for such key precursor chemicals as chlorine, ammonia and nitric acid. In fact, Olin's degree of integration is unmatched by any other U.S. supplier. Independence in raw materials makes Olin a highly reliable TDI source for the urethanes industry.

Olin in Urethanes

Olin's experience in urethanes goes back more than 25 years. In addition to TDI, Olin produces many other products for rigid and flexible foams and for non-foams. These products include: polyether polyols, rigid foam systems (chemicals and dispensing systems) and flame retardants.*

Domestically, Olin polyols are produced in Brandenburg, KY; urethane systems in Brook Park, OH, and Benicia, CA; and flame retardants in Lake Charles, LA. All these products are available at their production sites; some of them are also available from Olin distribution centers across the country. (For the availability of TDI, see page 3.) Olin also has polyol plants in Venezuela and Japan, and a urethanes systems business in Brazil.

Olin can provide valuable on-site assistance, including a seminar on safety and handling, to users of TDI and other urethane products. Additional comprehensive analytical capability and technical services are available from our Process Technology Laboratories in Lake Charles, LA, Brandenburg, KY, and New Haven, CT, as well as from our new Chemicals Research Laboratory in Cheshire, CT.

If you have any questions regarding the application, handling or use of TDI not answered by this brochure, please contact your nearest Olin Sales Office (see inside back cover). Or contact Marketing Manager, TDI, Olin Chemicals, 120 Long Ridge Road, Stamford, CT 06904.

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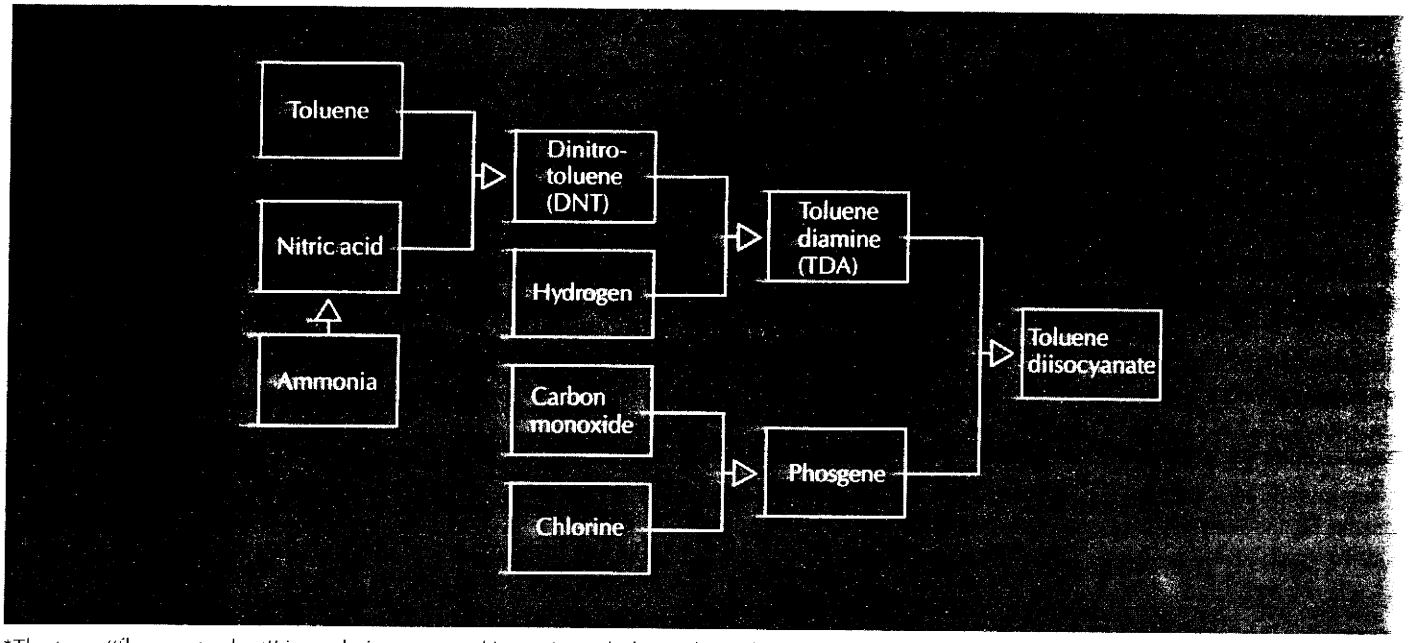


*The term "flame retardant" is a relative term and is not intended to indicate hazards presented by foams under actual fire conditions.

PROPERTIES

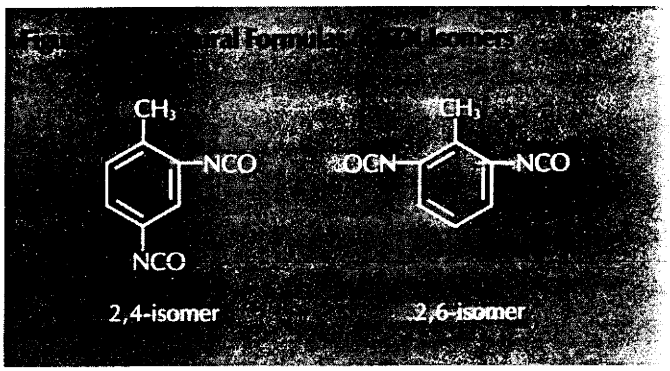
Olin toluene diisocyanate is referred to as TDI-80 because it is an 80:20 mixture of the 2,4- and 2,6-isomers of TDI. Structural formulas of these isomers are shown in Figure 2.

Olin produces TDI-80 in two forms, designated Type I and Type II. Both have the 80:20 isomer ratio, but they differ slightly in acidity and hydrolyzable chloride content.

Type I is used in foam and non-foam urethanes. Type II is used in non-foam urethanes, rebonded flexible foam and other applications.

Physical properties of TDI-80, Types I and II, are shown in Figure 3. Those properties marked by an asterisk (*) are Olin specifications; other properties are those typical of commercially available TDI.

TDI has a sharp, pungent, sweetish odor. Its vapors are toxic. Certain precautions are necessary when handling or using toluene diisocyanate. Before using TDI, obtain and study Olin's Material Safety Data Sheet (MSDS) and product literature. For more information, see *TDI Safety & Handling*, page 10.



Reactivity

Olin TDI is a clear liquid, water white to light yellow in color. It yellows on exposure to light.

Chemical: TDI reacts readily with compounds containing active hydrogens, such as acids and alcohols. Contact with bases, such as caustic soda or tertiary amines, might cause uncontrollable polymerization and rapid evolution of heat.

Water: On contact with water, aromatic poly-substituted ureas are formed, and carbon dioxide plus heat are evolved. In time, white aromatic polyurea crystals will precipitate.

Heat: High temperatures can cause formation of dimer and discoloration of the TDI. This phenomenon is time- and temperature-related (see Figure 4, page 3). When the level of dimer approaches 1% by weight, solid dimer forms as needle-like crystals. These crystals cannot be completely filtered out because the solution is supersaturated and new crystals are formed to replace those which are removed.

Temperatures below 15°C (59°F) cause TDI to freeze. Frozen TDI is also white and crystalline. If frozen, TDI may be thawed by heating (see *Thawing TDI Tank Cars*, page 8, for methods and proper precautions).

NOTE: As can be seen from the above discussion, if white crystals are detected in TDI, they may be frozen TDI, aromatic polyurea or dimer. For suggestions on dealing with such situations, see *What To Do In Case Of...*, page 5.

Figure 3. Physical Properties

Molecular Weight	174.163
Assay*, min (%)	99.7
Isomer Ratio* %	
2,4-isomer	80 ± 1
2,6-isomer	20 ± 1
Acidity*, as HCl (%)	
Type I	0.002-0.004
Type II	0.008-0.010
Hydrolyzable Chlorides * (%)	
Type I	0.003-0.008
Type II	0.011-0.014
Chlorine*, max (%)	0.20
Ash (ppm)	20
Color (APHA)	15
Specific Gravity @ 25/25°C [77/77°F]	1.22 ± 0.01
Density (lbs per gal)	
@ 15.5°C [60°F]	10.23
@ 20°C [68°F]	10.14
@ 38°C [100°F]	10.02
@ 60°C [140°F]	9.86
Viscosity (cs)	
@ 50°C [122°F]	1.5
@ 100°C [212°F]	0.8
@ 135°C [275°F]	0.5
Melting Point Range (°C)	11.5-13.5
(°F)	52.7-56.3
Freezing Point	
2,4-isomer (°C)	15.0
(°F)	59.0
2,6-isomer (°C)	7.2
(°F)	45.0
Boiling Point	
@ 10mm Hg (°C)	121
(°F)	250
@ 760mm Hg (°C)	251†
(°F)	484†
Flash Point‡, COC (°C)	132
(°F)	270
Fire Point, COC (°C)	142
(°F)	288
Latent Heat of Evaporation (Btu/lb)	
@ 120°C [248°F]	131
@ 180°C [356°F]	121
Vapor Density, air = 1	6
Vapor Pressure, approx. (mm Hg)	
@ 20°C [68°F]	0.01
@ 120°C [248°F]	11
@ 130°C [266°F]	16

* Olin Specification † Decomposes

‡The flammability properties of this material (or any other material) are not intended to reflect the fire hazards presented by any resultant cellular or foamed plastic product.

TDI SHIPMENTS

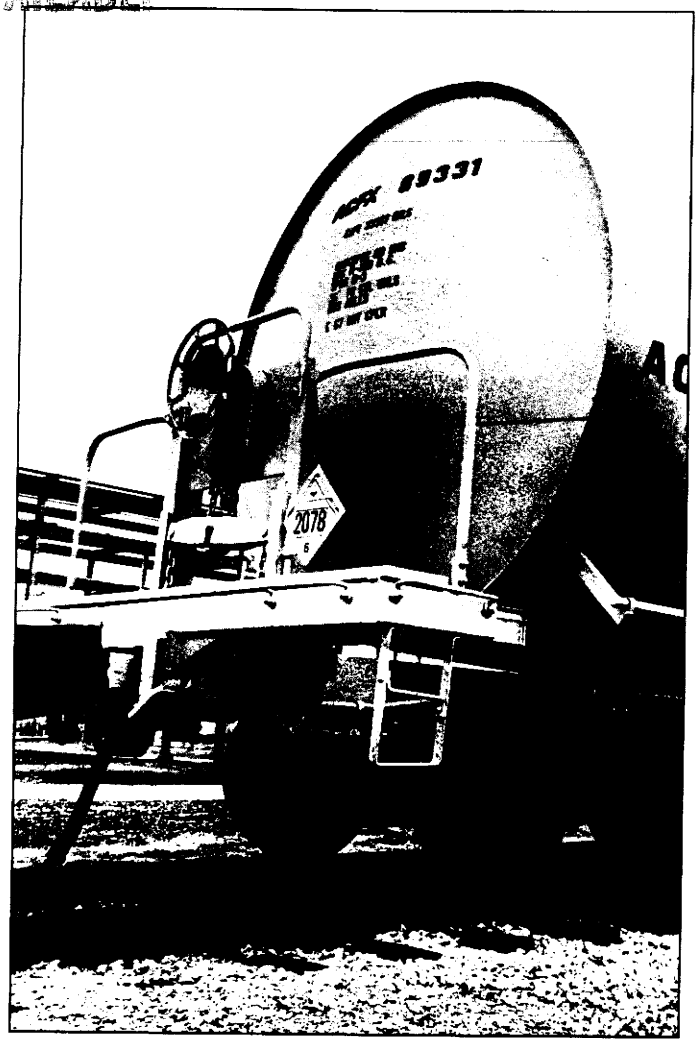
Olin TDI is produced in Lake Charles, LA, and may be obtained in tank cars, tank trucks or drums from this plant or various distribution centers and terminals throughout the U.S. For export, Olin has the capacity to ship TDI in bulk and full-container lots of drums via ocean vessels. Olin also maintains TDI inventory in several countries to better serve export customers.

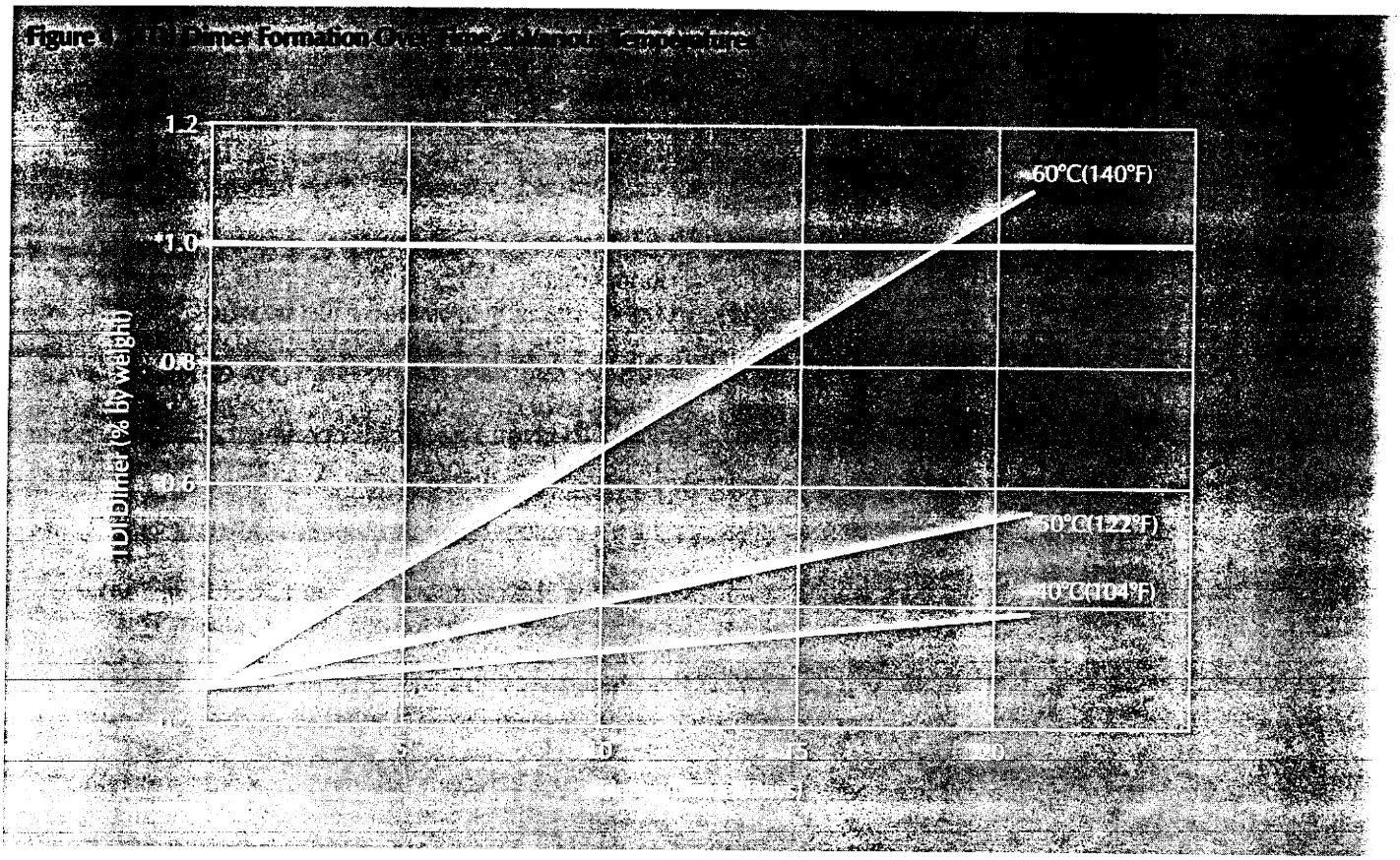
Tank Cars: TDI is most frequently shipped in 20,000-gal. cars, although other sizes are available upon request. The 20,000-gal. cars are normally loaded to 190,000 lbs. and pressurized with nitrogen. All cars are insulated and have exterior heating coils. We try to meet customers' temperature requirements, but Olin cannot guarantee specific arrival temperatures with tank car deliveries.

Tank Trucks: TDI is shipped in 4,000- to 5,000-gal. trucks. Shipment weights range from 40,000 to 50,000 lbs., depending on the point of origin and road weight regulations. Tanks are constructed of stainless steel; all are insulated and have exterior coils. Olin delivers at temperatures within the range specified by the customer. TDI is shipped under a nitrogen pad and all Olin tank trucks are equipped with air drying systems to prevent contamination during off-loading.

Drums: TDI is available in 55-gal. non-returnable drums, made of 18-gauge steel (minimum), with phosphatized interiors. Drums contain 551 lbs. (250 kg) of TDI.

Ocean Vessels: Olin has the capability to serve world markets with shipments of large quantities in bulk or in drums.





*Dimer crystals precipitate at ambient temperature when dimer concentration approaches 1%.

UNLOADING

Toluene diisocyanate is regulated by the Department of Transportation (DOT) as a Class B poison. Since TDI can cause serious injury to the lungs, eyes and skin, all persons near the unloading site must wear protective clothing and equipment. They must observe the safe-handling procedures and practices prescribed in Olin's MSDS and product literature. The section of this brochure entitled *TDI Safety and Handling* (page 10) should be carefully read by, and explained to, all employees. For additional employee training, Olin offers videotapes covering handling procedures.

Customers should give careful consideration to the way that TDI will be received. Adequate facilities must be provided (see *Storage of TDI*, page 9). Ample water should be available at the unloading site, including a shower equipped with a quick-opening deluge head and an eyewash fountain.

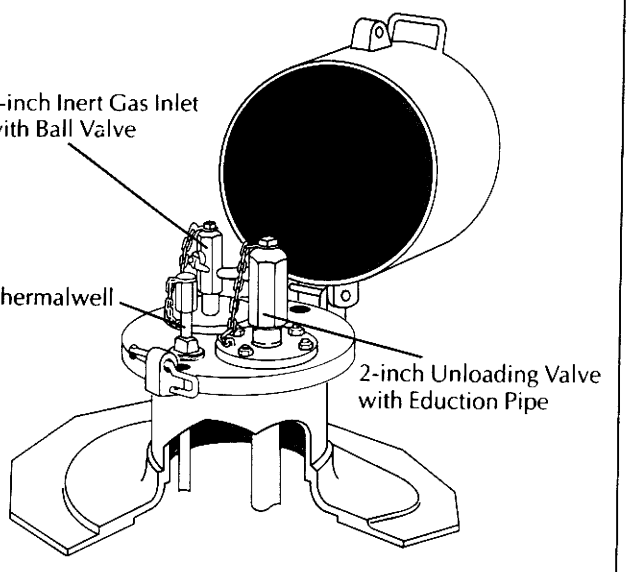
The site should also be equipped with an inert gas such as nitrogen or dry air for use in padding the car and purging lines.

NOTE: While nitrogen is preferred, all future references in this brochure to "inert gas" should be taken to mean either nitrogen or dry air (−40°C/°F dew point), and all references to nitrogen should be taken to mean that dry air may also be used.

TDI Tank Cars

Olin operates a large fleet of dedicated TDI tank cars. Most have a capacity of 20,000 gallons. Figure 5 shows a typical arrangement of the fittings found under the bonnet on the top of the tank car. In addition to these bonnet fittings, every car, regardless of type, has a manway and safety valve. Not found on every car is a thermalwell under the bonnet, which is used in taking the temperature of the car's contents.

Figure 5. Typical Tank-Car Bonnet Fittings



All Olin cars are designed for top unloading through the eduction pipe. (See Figure 6 for typical connections; see Figure 7 for sectional view of a typical tank car showing the eduction pipe.)

TDI cars are insulated to prevent freezing. However, in the event freezing occurs, all cars have external steam coils for thawing the TDI (see *Thawing TDI Tank Cars*, page 8).

Preliminary Procedures

Before tank cars or tank trucks are unloaded, all workers must wear proper protective clothing and equipment. The following three steps should then be taken. (Note: For tank trucks, depressurization is the responsibility of the driver. Temperature-taking and sampling are the responsibility of the customer.)

1. Depressurize the Car: Open the ball valve on the 1-inch inert gas inlet located on top of the car (see Figure 5).

2. Take TDI Temperature: Normally, temperature is taken through a thermalwell, which is located between the 1-inch inert gas inlet and the 2-inch eduction pipe. Insert a thermocouple into the thermalwell and read the temperature.

If the car is not equipped with a thermalwell, take the temperature through the 1-inch inert gas inlet, using a Min/Max[a] thermometer. (The use of a conventional thermometer may result in an erroneous reading because the ambient temperature is usually lower than the internal TDI temperature.) *If the gas inlet valve is used, a self-contained breathing apparatus must be worn as protection from TDI vapors.*

TDI-80 is normally loaded into insulated tank cars or tank trucks at 24-30°C (75-86°F); in winter, at 38-43°C (100-110°F). Recommended unloading temperature is 21-30°C (70-86°F). If the temperature is between 17°C and 21°C (63-70°F) the TDI can be heated. If the temperature is below 17°C, it is likely that there is some freezing, and the TDI must be thawed (see page 8).

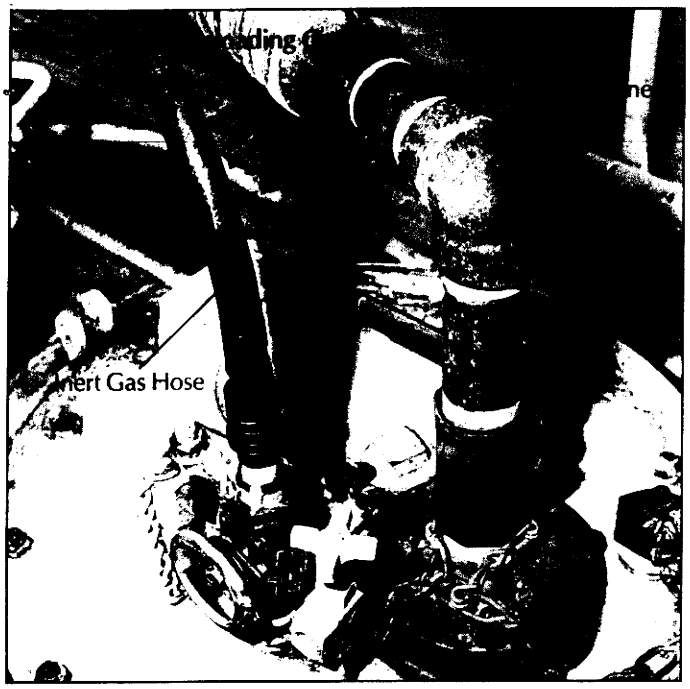
3. Sample Car Contents: After the car or truck has been depressurized and the TDI temperature measured, a sample should be taken for testing. While this is being done, goggles, full protective clothing and a self-contained breathing apparatus must be worn.

Most Olin tank trucks are equipped with a sampling tube. For tank cars, the preferred procedure is to take a sample from the unloading line (through a customer-installed valve). This avoids opening the manway cover and loss of the nitrogen pad, and thus eliminates a possible source of contamination.

If a sample is taken through this valve, first flush out 1-5 gallons of TDI (for proper disposal procedure, see *Handling Spills and Leaks*, page 12). Flushing ensures that a representative sample is being taken. This is particularly important in determining if aromatic polyurea or dimer (white precipitate) is present.

If a sample must be taken directly from a pressurized car or truck manway, be sure it is an "all-level" sample, taken from each compartment, at or near atmospheric pressure. Car hatches should be open for as little time as

[a]Fisher Scientific, Catalog #15-09.



possible. During inclement weather, make provision to prevent contamination of the product.

An all-level sample is taken using an amber-colored glass bottle in a weighted bottle holder. Be certain that workers are wearing proper protective gear before and during sampling.

To be sure of getting a representative sample, the bottle holder should be lowered to the bottom and then withdrawn at such a rate that the bottle is not quite full when it reaches the surface. (This may take some practice.) Keep the sample out of direct sunlight to prevent yellowing.

The filled sample bottle should be capped, cleaned and plainly labeled with product lot numbers, tank car or truck number, compartment number (if more than one), date and sampler's initials.

What To Do In Case Of...

White Precipitates: There are three causes of white precipitates in TDI: dimer (caused by excessive heat), aromatic polyurea (caused by the presence of water) or frozen TDI. If it is not obvious which of the three is present, heat the crystals. If they melt at 16°-21°C (60°-70°F), they are frozen TDI. If they melt at 150°-160°C (302°-320°F), they are dimer. If they do not melt, they are aromatic polyurea.

If the crystals are frozen TDI, the product can be thawed, remixed and used. If the crystals are aromatic polyurea, they can be filtered out and the remainder of the TDI can be used. However, if the crystals are dimer, they cannot be completely removed (dimer reforms on filtration). The TDI should not be used because the dimer will affect urethane physical properties. It will clog lines and foam heads, as well. If dimer is present, contact Olin.

Discoloration: Normal TDI is water-white to pale yellow in color. A darker color means the TDI has been exposed to light or high temperature. A color something other than water-white to pale yellow means the TDI has been contaminated and should not be used. Call Olin for assistance.

If the color has darkened, assume the cause is high temperature. (The chances of light-induced discoloration are negligible). Since the high temperature may also cause dimer formation, the TDI should be tested. Simply cool a sample to room temperature. If white crystals precipitate, dimer is present and the TDI should not be used. If no white crystals are present, the TDI may be used. The discoloration will not affect physical properties or foam color.

General Unloading Regulations and Suggestions

Department of Transportation regulations for unloading tank cars are given in Section 174.67 of Title 49, *Code of Federal Regulations, Hazardous Materials Regulations*. The regulations require that all persons responsible for tank car unloading should be familiar with these regulations and that all applicable requirements should be observed.

Below are some of the pertinent Federal requirements and their source references within Section 174.67. Following several of them are related suggestions and recommendations, which Olin believes are also necessary or important to follow, even though they may not be part of the regulations. These are printed in *italic type*. The most important recommendation that Olin makes is that workers be familiar with the health and safety aspects of TDI, and that they use the proper protective equipment when contact with this product is possible.

1. Unloading operations must be performed only by reliable persons properly instructed in unloading hazardous materials and made responsible for careful compliance with this part. [174.67 (a) (1)]

2. Brakes must be set and wheels blocked on all cars being unloaded. [174.67 (a) (2)]

Tank cars should also be protected during unloading by such means as derails or locked switches.

3. Caution signs must be so placed on the track or cars to give necessary warning to persons approaching the cars from the open end of a siding. Signs must be left up until after the cars are unloaded and disconnected from the discharge connection. [174.67 (a) (3)]

The signs must be of metal or other comparable material, at least 12 inches high by 15 inches wide, and must bear the words, "STOP — Tank Car Connected" or "STOP — Men at Work." The letters are to be white on a blue background, with the word "STOP" at least 4 inches high and the others at least 2 inches high.

If the unloading area has heavy traffic, it should be roped off and passersby warned by posting "Danger — TDI" signs.

The contents of tank cars should only be unloaded during daylight hours or when adequate lighting is provided.

4. Unloading connections must be securely attached to unloading pipes on the dome outlet...before any discharge valves are opened. [174.67 (h)]

Tank cars must be depressurized before making any unloading connections.

5. Tank cars may not be allowed to stand with unloading connections attached after unloading is completed. Throughout the entire period of unloading, and

while car is connected to unloading device, the car must be attended by the unloader. [174.67 (i)]

6. If necessary to discontinue unloading a tank car for any reason, all unloading connections must be disconnected. All valves must first be tightly closed, and the closures of all other openings securely applied. [174.67 (j)]

Before disconnecting — for any reason — *all lines should be cleared of liquid material by blowing with nitrogen or dry air.*

7. As soon as a tank car is completely unloaded, all valves must be made tight, the unloading connections must be removed and all other closures made tight, except for heater coil inlet and outlet pipes, which must be left open for drainage. If it has been opened, the manway cover must be reapplied by the use of a bar or wrench, the outlet reducer and outlet valve cap replaced by the use of a wrench having a handle at least 36 inches long, and outlet valve cap plug, end plug and all other closures of openings and their protective housings must be closed by the use of a suitable tool. [174.67 (k)]

Unloading TDI

TDI tank cars must be unloaded from the top, through the 2-inch eduction pipe (dip leg).

NOTE: Even though some cars have bottom unloading valves, these valves have been locked and must not be opened.

Figure 7. Sectional View of Tank Car

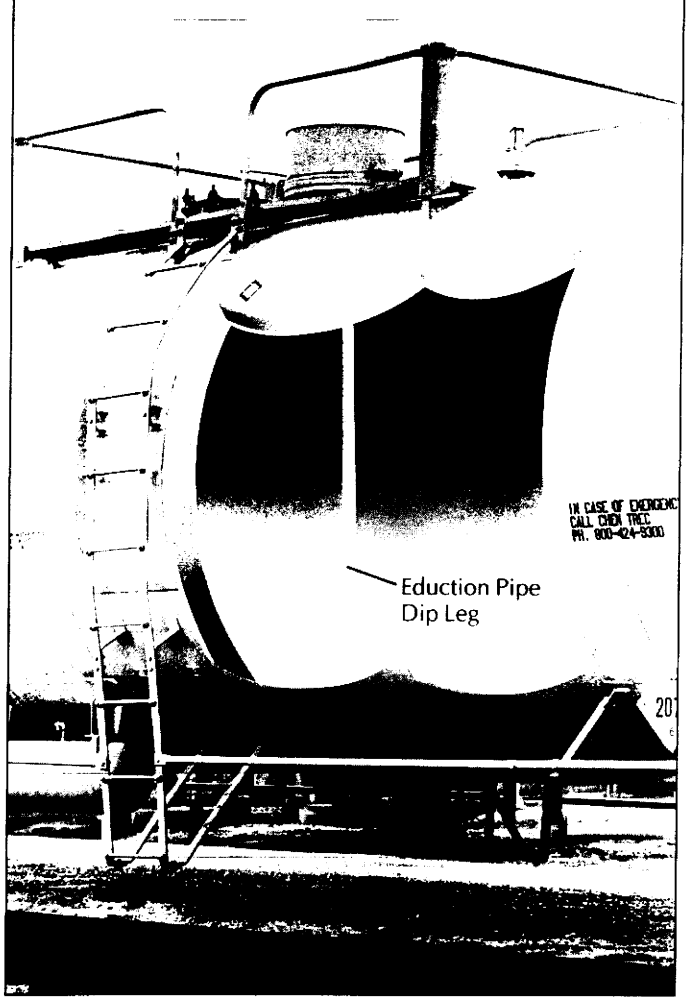


Figure 8 (page 7) shows how unloading is accomplished using nitrogen. This dry-atmosphere padding is necessary to prevent a reaction between the TDI and any water vapor that might be present. Under no circumstances should a combustible gas be used; it presents an explosion hazard.

All fittings should be inspected for evidence of actual or potential leaks before the tank and piping system are pressurized. An oil trap should be installed on the inert gas supply line.

Tank cars are protected by a safety valve set to relieve at 30 psig. The pressure system should be designed so as not to exceed a safe working limit; a pressure of 10-20 psig is recommended.

The steps involved in positioning the car and installing the necessary safety devices must be carried out in accordance with the regulations set forth in Section 174.67, as outlined above. Before starting to unload, follow the instructions for depressurizing the car, taking the temperature and sampling, under *Preliminary Procedures*, also above. Then:

1. Be sure the tank car manway is secured. Make sure the storage tank is adequately vented.

2. While the 1-inch inlet valve is closed, remove the plug and connect the inert gas line. (See Figures 5 and 8.)

3. The temperature of the unloading line should be 21-30°C (70-86°F), the proper temperature for unloading. Check the line temperature — and preheat the line if necessary — before connecting it to the 2-inch unloading valve, which leads to the eduction pipe (Figure 7).

4. Open all valves in the unloading line.

5. Open the inert gas supply valve. The pressure on the car will be effectively established by the setting of the inert gas pressure regulating valve. The flow of TDI can be controlled by a valve in the unloading line.

After unloading is complete (or if unloading must be interrupted):

1. Purge the unloading line with nitrogen before disconnecting. Equalize the line pressure. Close all valves in the line. Disconnect the unloading valve and cap it.

2. Disconnect the steam lines and purge the coil by blowing with nitrogen. *Do not replace the caps on the steam line.*

3. Repressurize the car with nitrogen to 5-10 psig.

4. Secure the dome bonnet.

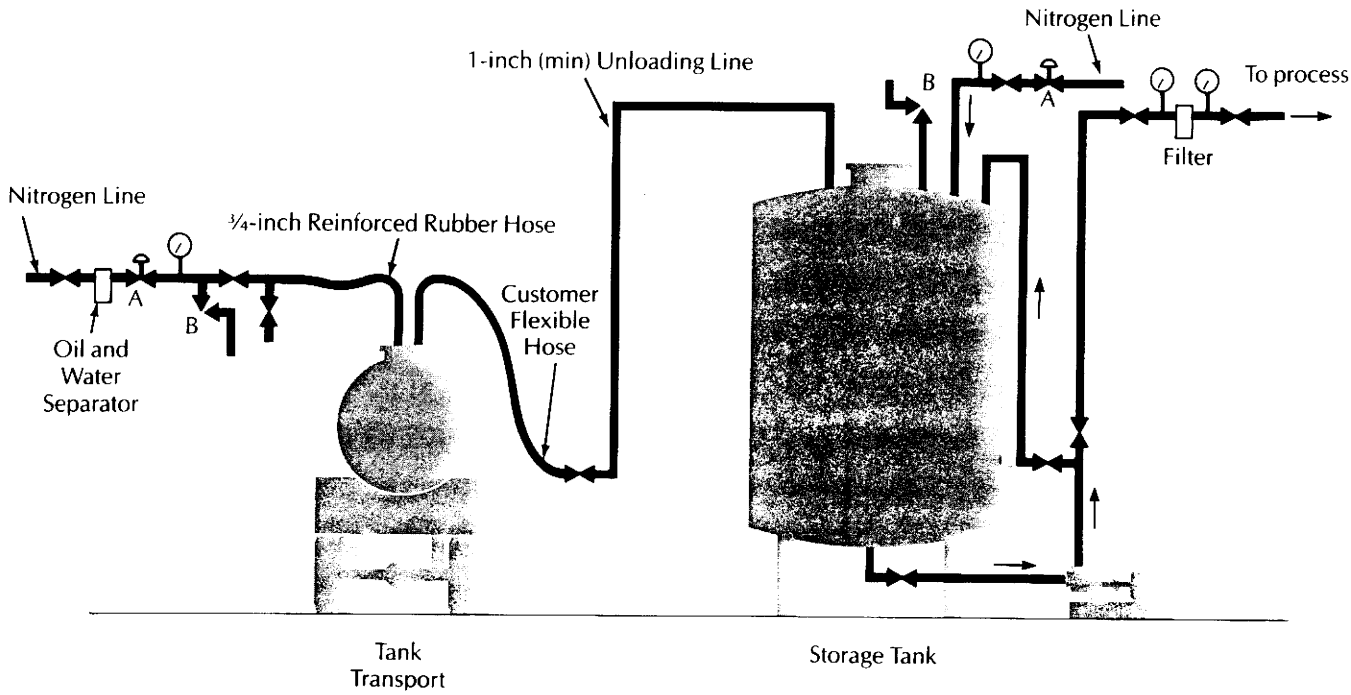
5. Be sure all four placards are reversed and in place before returning the car by the prescribed routing.

Unloading Tank Trucks

Prior to unloading, it is the recipient's responsibility to provide competent and knowledgeable supervision, safety equipment and a properly designed unloading area. Tank trucks are unloaded by the driver of the vehicle. He is responsible for following the proper safety rules, as prescribed by recipient, by Olin and by government regulations.

The unloading area must be large enough for easy turning and positioning of the vehicle. It should be level, to insure complete unloading. It must be covered

Figure 8. Top Unloading and Storage Arrangement



with an impervious material, such as concrete or steel plate (not asphalt), to prevent ground contamination in the event of a spill. The area also must be contained to prevent a spill from spreading. Safety showers and eye-wash stations must be nearby.

The supervisor should make sure the unloading area is clear and that adequate facilities are ready for receiving the shipment.

Before unloading begins, the supervisor must check the temperature of the TDI (and adjust it, if necessary). When the temperature is within the proper limits, we recommend that the supervisor take a sample of the shipment. Some tank trucks are equipped with a sampling tube for this purpose. (See under *Preliminary Procedures*, page 4.)

After unloading is complete, all lines should be purged with nitrogen. The tank truck should then be padded with nitrogen (3-5 psig).

Unloading Drums

Follow all applicable safety procedures. Be sure full protective clothing is worn (see Figure 13, page 11) when opening the drum plug (bung), when placing or operating pumps, or when flushing out empty drums. In the event of spillage, see *Handling Spills and Leaks*, page 12.

If the TDI is frozen, or there is a possibility of freezing because the drums have been exposed to ambient temperatures below 17°C (63°F), then the drums should be heated to 35°-40°C (95-105°F) until all TDI is liquid. Do not heat above 43°C (110°F). After the TDI is thawed, the drums should be rolled for at least 30 minutes to uniformly mix the 2,4- and 2,6-isomers.

During unloading, drums should be kept under a nitrogen pad to prevent contamination by water vapor. However, unloading by pressure is unsafe.

The preferred method is by pump, either manual or electric (see Figure 9). If the pump is electrical, be sure the drum is properly grounded. If the drum is to be unloaded by gravity, the faucets should be self-closing. Bungholes should be fitted with a dryer-breather vent device to prevent drum collapse.

Figure 9. Drum Unloading System

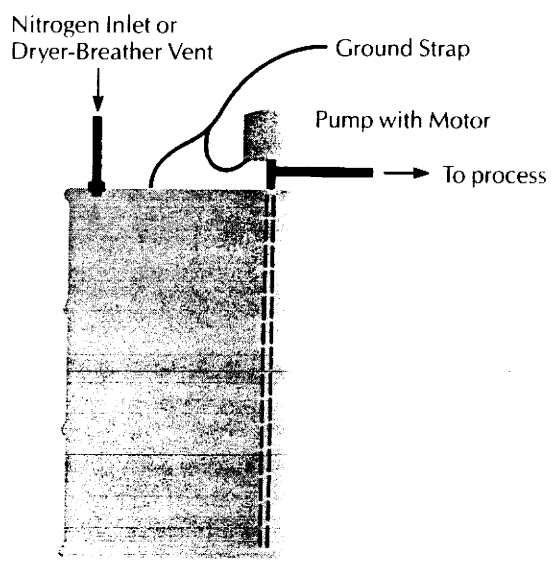
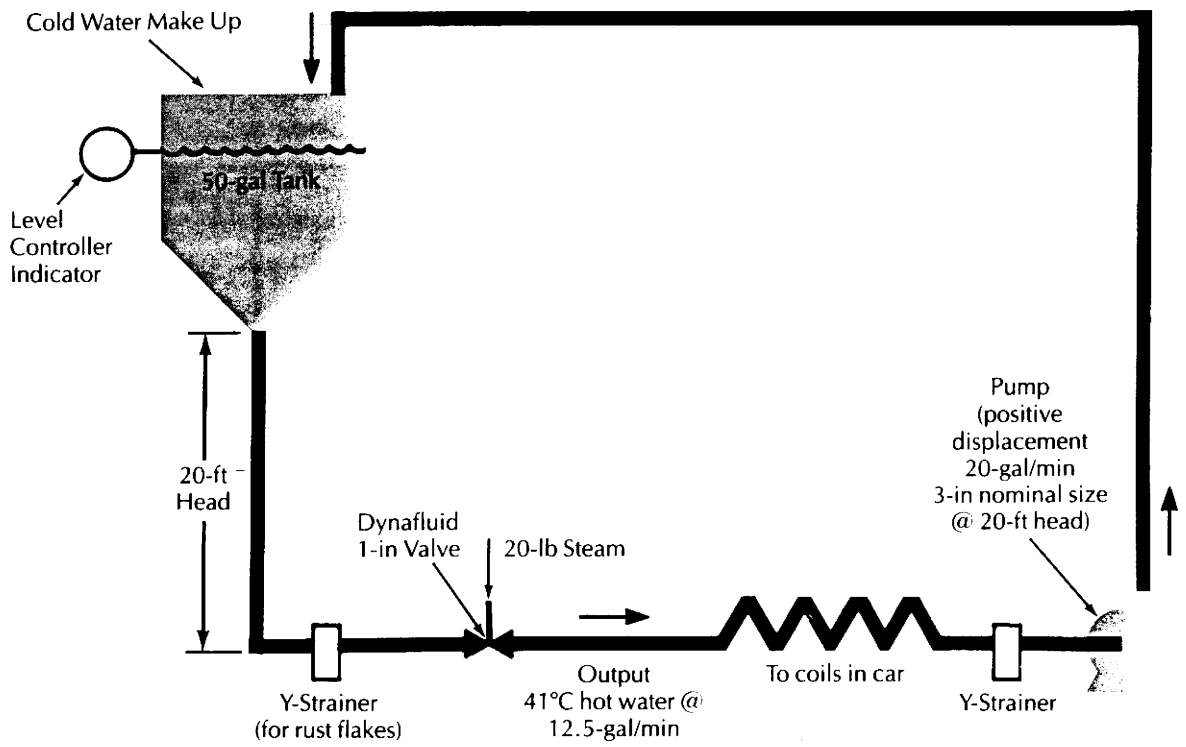


Figure 10. Steam/Water Mixing System



THAWING TDI TANK CARS

TDI is shipped in insulated tank cars. During the winter, it is loaded at temperatures between 38° and 43°C (100-110°F). Despite these precautions, there may be substantial heat loss before the car reaches its final destination.

Therefore, during the winter, all incoming tank cars of TDI should be checked for freezing.

The 2,4-isomer of TDI-80 freezes at 15°C (59°F); the 2,6-isomer at 7.2°C (45°F). Between these two temperatures, only the 2,4-isomer freezes. If this happens, isomer stratification takes place.

NOTE: Upon thawing TDI, the layers will remain separated and processing problems can be expected. However, if proper care is taken in thawing and remixing TDI, the quality can be maintained and no processing problems should occur.

How to Determine if TDI is Frozen

The way to tell if TDI is frozen is by taking its temperature while wearing proper protective equipment. *Do not open the manway to inspect it visually.* Temperature measurement is accurate and will detect frozen TDI, even when it is not visible.

To take TDI temperature, see page 4.

When to Heat a TDI Car

If the TDI temperature is less than 17°C (63°F), the car should be heated before it is unloaded.

NOTE: If the car is not to be heated, immediately, it should be repressurized to 5-10 psig with nitrogen to prevent crystals from forming as the result of contamination of the TDI with water. It should be depressurized before heating and unloading.

How to Heat a TDI Tank Car

The TDI should be heated to 35-40°C (95-105°F) until all the frozen TDI has thawed. *Never allow the TDI temperature to exceed 43°C (110°F).* If TDI is overheated, dimerization may take place. (See discussion under *Heat* on page 2 and graph showing conditions for dimer formation, Figure 4, page 3). If dimer forms, the TDI should not be used. Call Olin for technical assistance.

Heat Sources: The best way to thaw frozen TDI is with tempered hot water, thermostatically controlled to 41°C (106°F). Hot water is less likely to cause dimerization than steam.

If tempered hot water is not available, an alternate source of heat is 20-lb steam, mixed with cold water. A steam/water mixing system similar to the one shown in Figure 10 can be used to obtain the desired temperature.

Plants that have only steam available should avoid pressures above 20 lbs. High pressure steam, if not watched very carefully, will rapidly overheat the TDI. Even at lower temperatures, careful monitoring must take place.

Heat Source Connections: Olin has a mixed fleet of tank cars that were designed by different tank car manufacturers and put into service at different times. Therefore, cars must be carefully examined to determine the size and location of the external coil inlets and outlets.

In general, the inlet is on one side of the car, away from the handbrake (Figure 11). Some cars have two inlet valves. On these cars, the one farthest away from the handbrake side is for the left side coils; the one nearest the handbrake side is for the right coils.

Cars with a bottom outlet valve may have a separate inlet and outlet coil around this valve. If these valves and coils must be used, they should be hooked up separately. When thawing bottom valves, take care not to damage the valve seats or to form dimer in and around the ball. This could prevent the valves from opening.

After TDI is Thawed

After the TDI has been heated to 35-40°C (95-105°F), it must be completely mixed to eliminate isomer separation. Unload the entire contents into a bulk storage tank and circulate for two to three hours before use.

STORAGE OF TDI

Toluene diisocyanate may be stored indoors or outdoors.

If TDI is stored indoors, the building should have sprinklers, good ventilation and adequate heat to maintain storage temperature of 21°C (70°F). Constant monitoring of TDI temperature is required.

If TDI is stored outdoors, or if indoor temperature may drop below 21°C, provisions must be made for warming and thawing the TDI. These include adequate tank and line insulation, external heating coils or jackets, and steam-traced or electrically heated lines.

If thawing is necessary, never heat the TDI above 43°C (110°F). Prolonged overheating will cause dimer formation (see *Heat*, page 2, and Figure 4, page 3). After thawing, mix the TDI to eliminate isomer separation. Use a tank agitator or a circulating pump.

Whether indoors or outdoors, bulk storage tanks should be blanketed with nitrogen. Without this dry atmosphere, water vapor will react with the TDI to form solid aromatic polyurea, which can plug lines and foam machine heads.

A pneumatic bubbler gauge[a] that operates with nitrogen is recommended. This gauge measures the pressure required to displace TDI from a vertical tube in the tank.

Storage Tank Design

Vertical, cylindrical steel tanks are normally preferred for storing TDI, although limited indoor headroom may dictate the use of horizontal tanks.

Storage tanks may be field-erected on a concrete foundation, and there is no practical limitation to size. Recommended capacity is 30,000 gallons for tank car deliveries and 6-8,000 gallons for tank trucks. In other words, capacity should be sufficient to accept the entire contents of a tank car or truck, even when half-filled.

Materials of Construction

TDI tanks can be made from carbon steel (ASTM A 285 Grade C) or from stainless steel (Type 304 or 316). API Code 650 specifies ¼-inch steel for the bottom; 3/16-inch for the shell and roof.

Stainless steel tanks require no lining. Carbon steel tanks should have a baked phenolic lining. Recommended are: Heresite P 403[b], Lithcote LC 73[c], or Amercote 75[d]. The inside surface should be sandblasted to a commercial finish and cleaned prior to the application of the lining.

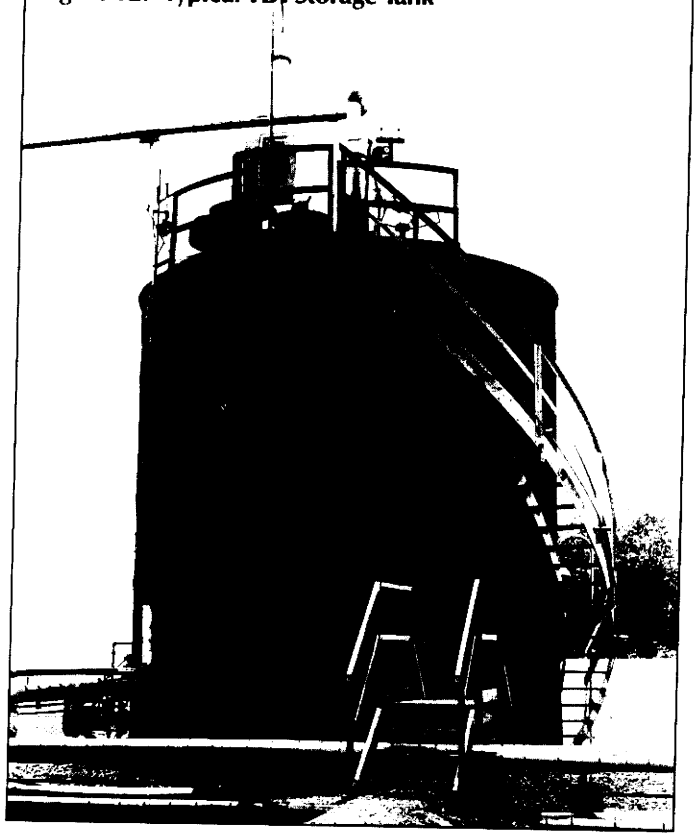
Hose and Piping to Receive TDI

From tank cars: TDI is discharged by nitrogen pressure supplied by the customer through flexible hose into piping to the storage tank. Both the hose and the piping are provided by the customer. The hose should be made of flexible stainless steel or lined with butyl rubber or non-virgin TFE.

When unloading, it is also necessary to repressurize the car. Use a ¾-inch reinforced rubber hose attached to the 1-inch inert gas inlet fitting.

From tank trucks: TDI is usually discharged by dry air from a built-in compressor on the truck through flexible hose provided by the trucker into piping supplied by the customer. The length of hose is specified by the customer with his first order. The piping should be Schedule 40 steel, or Aluminum Alloy 3003. An oil and water separator and pressure regulator are also suggested as an assembly in the line.

Figure 12. Typical TDI Storage Tank



[a]Petrometer Corp., New Hyde Park, NY, or Varec Div., Emerson Electric Co., Garden Grove, CA
[b]Heresite-Saekaphen, Inc., Maintowoc, WI
[c]Lithcote Company, Cherry Hill, NJ
[d]Amercon Corporation, Altoona, PA

Auxiliary Equipment

Valves: Ball valves should be stainless steel with non-virgin TFE seals. Plug valves should be stainless steel or alloy 30, with non-virgin TFE sleeve. Valves may be threaded or they may be flanged (150-lb ASA or MSS).

Liquid filter and pressure gauges: A filter should be placed in the piping between the tank car or tank truck and the storage tank. A cartridge with a 20- or 30-micron glass fiber element is recommended.

Pressure gauges should be installed on either side of the filter to measure the drop. This will indicate when the filter must be cleaned or replaced.

Sampling valves: If delivery is by tank car, an in-line sampling valve is recommended (see page 4).

TDI SAFETY AND HANDLING

The following contains information as of March 1, 1988. The health and safety information is partial. For complete up-to-date information, obtain and read the current Material Safety Data Sheet (MSDS). To order an MSDS, call your nearest Olin Sales Office listed on the inside back cover.

Toluene diisocyanate is a toxic and highly reactive compound. It should be kept in closed, isolated systems and transferred with care. However, TDI is not a difficult material to handle. If proper procedures are followed, there is relatively little chance of danger.

The sections below briefly discuss some possible hazards and describe what to do in an emergency. Plant personnel should be thoroughly familiar with these procedures.

Reactivity Hazards

TDI is a stable compound with a relatively high flash point. However, it will react with water, acids, bases and other organic and inorganic compounds. TDI is also affected by heat, and like any organic compound, will burn.

Water: When TDI comes in contact with water, aromatic polyurea is formed, heat is generated and carbon dioxide is evolved. Pressure build-up from the carbon dioxide will occur. This pressure could rupture a storage vessel.

To help prevent reactions with water, the TDI should be kept under a nitrogen pad.

Chemical: Contact between TDI and acids should be avoided. Contact with bases, such as caustic soda and primary and secondary amines, might produce a violent reaction. The heat given off causes pressure build-up and risk of rupture of the storage vessel. Contact with tertiary amines (commonly used as urethane catalysts) may cause uncontrollable polymerization, with a similar result. High temperatures may also cause dimerization.

TDI should be kept away from certain rubber and plastics. These materials will rapidly become embrittled; cracks may develop and their strength may be weakened.

Fire Hazards

TDI has a flash point of 132°C (270°F) and therefore does not constitute a severe fire hazard. However, it should be remembered that TDI is an organic material and will burn when exposed to fire. In addition, the flash point of TDI does not reflect the hazards presented by any cellular or foam plastic product that contains TDI.

Health Hazards

TDI can be dangerous to health in either its vapor or liquid forms. TDI vapor can be detected by its characteristic sweet pungent odor. Unfortunately, if you can smell it, there is probably already too much vapor present (0.04 ppm, minimum). Therefore, a monitor should be used to determine the airborne concentration of TDI.

Some people may develop allergic lung sensitization similar to asthma, even at very low concentration. For this reason, pre-employment physical examinations should exclude persons with chronically recurring pulmonary disease or allergic history.

Inhalation: TDI is toxic from inhalation exposure. If inhaled, it may cause difficulty in breathing and irritation or injury to the lungs. Allergic sensitization to the respiratory tract is characterized by wheezing, choking and shortness of breath. Other symptoms include tightness in the chest, watering eyes, dry throat and headaches. These symptoms can occur in all persons exposed to TDI; however, sensitized persons may develop these symptoms at or below the threshold limit value.

Safeguards against inhalation include adequate ventilation, monitoring devices and air-supply gas masks. When adequate ventilation is temporarily interrupted, a self-contained breathing apparatus must be worn until adequate ventilation is reestablished.

Dermal and Oral Exposure: TDI is irritating to the skin, eyes and mucous membranes, and may cause burns if not removed quickly.

Ingestion of TDI can cause severe irritation of the gastrointestinal tract. TDI should be stored away from foodstuffs. Food should not be eaten where TDI might be present.

Protective Clothing

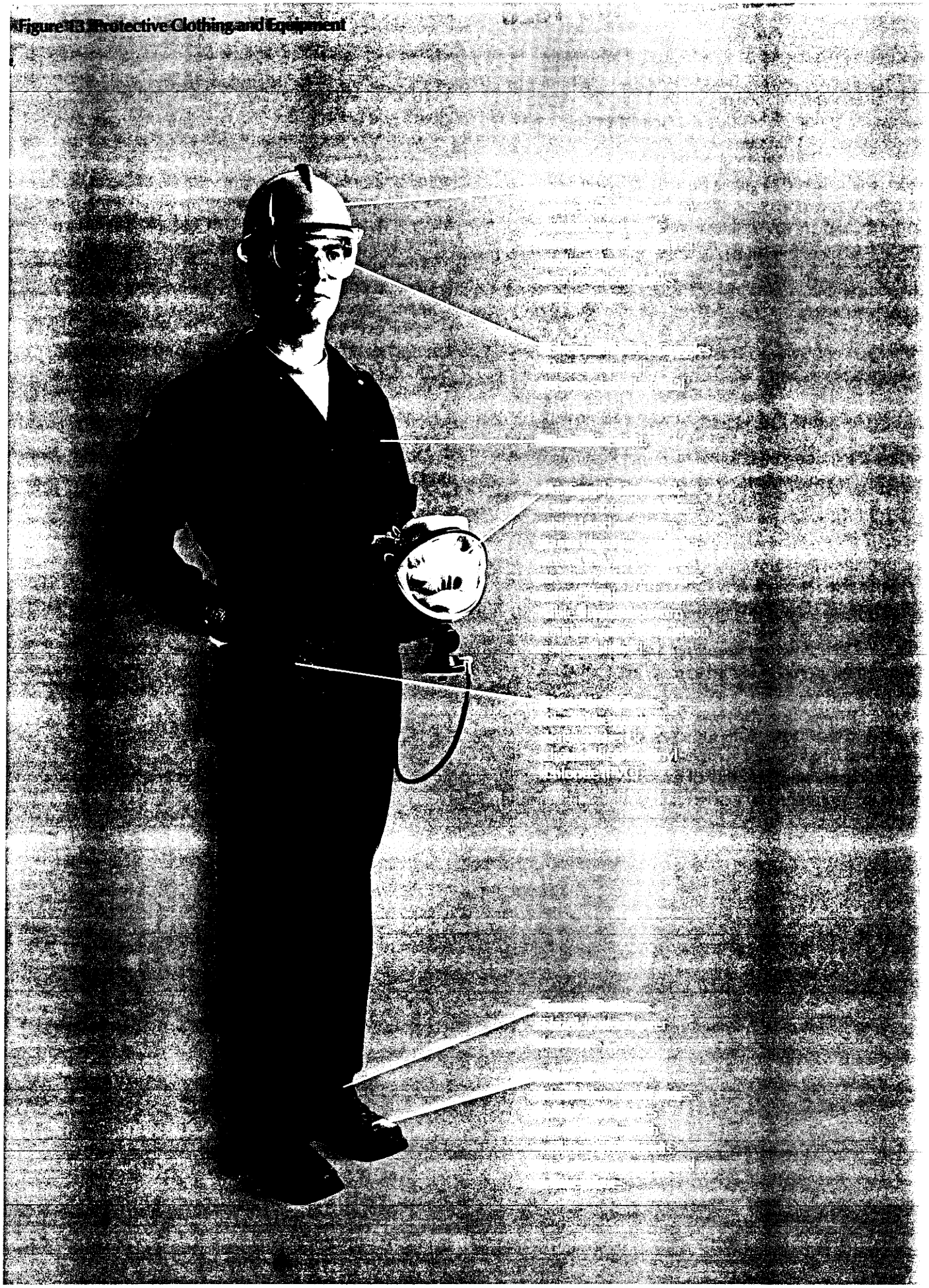
Because of the health hazards associated with TDI, full protective clothing and equipment must be worn whenever there is a possibility of contact (see Figure 13, next page). Such occasions include (but are not limited to) the following:

- When opening tank car hatches, truck manway covers or drum plugs.
- When connecting and disconnecting hoses and pipes.
- When placing and operating pumps.
- When breaking TDI piping, even if previously decontaminated.
- When flushing out drums.

If any article of clothing should be contaminated, remove it immediately and discard properly. (TDI damages both natural and synthetic fibers.)

This health and safety information is partial. For complete up-to-date information, obtain and read the current Material Safety Data Sheet (MSDS). To order an MSDS, call your nearest Olin Sales Office listed on the inside back cover.

Figure 13 Protective Clothing and Equipment



EMERGENCY ACTIONS

The following section contains basic information on what to do in the event of an accident. If additional information is necessary, refer to your TDI Material Safety Data Sheet (MSDS) or call the Olin Corporation Emergency Action Network (OCEAN). Speedy advice from experts can be received 24 hours a day by calling:

800-OLIN-911

You will be asked to give a brief description of the emergency and to leave your name and phone number. Shortly thereafter, you will receive a return call from someone experienced with TDI who will advise you of immediate action to be taken.

In addition, the Chemical Manufacturers Association (CMA) has established CHEMTREC to give advice on spill, leak or fire emergencies involving transportation or transport equipment. The CHEMTREC number for the United States and Canada is:

800-424-9300

(in the District of Columbia, call 438-7616).

NOTE: If the spill is greater than 100 lbs, Federal law requires it to be reported to the National Response Center (NRC). The number is:

800-424-8802

First Aid

If there is known contact with toluene diisocyanate, take the following steps:

Eyes or skin: Immediately flush thoroughly with water for 15 minutes. Call a physician.

Ingestion: Immediately drink large quantities of water to dilute. *Do not induce vomiting.* Call a physician.

Inhalation: Remove victim to fresh air. Call a physician.

Some symptoms of exposure to TDI vapors include tightness in the chest, watering eyes, dry throat and headaches. The onset of symptoms may be delayed. If there has been the possibility of exposure, the victim should be monitored by a physician until the individual is stabilized.

Handling Spills and Leaks

Wear a NIOSH/MSHA-approved positive-pressure, supplied-air respirator. Follow OSHA regulations for respirator use (see 29 *Code of Federal Regulations* 1910.134). Wear goggles, coveralls and impervious gloves and boots.

Add dry non-combustible absorbent, sweep up material and place in an approved DOT container. Add an equal amount of neutralizing solution to the container (90-95% water, 5-10% ammonia). Clean remaining surfaces with neutralizing solution and add this to container. Isolate the container in a well-ventilated place and do not seal for 24 hours. Ammonia vapors may be generated until the solution is neutralized. Wash all contaminated clothing before reuse.

In the event of a large spill, contact Olin Corporation Emergency Action Network (OCEAN) 24 hours a day at 800-OLIN-911.

In the event of a transportation emergency, contact CHEMTREC at 800-424-9300.

Waste Disposal Method

Dispose of contaminated product, empty containers and materials used in cleaning up spills or leaks in a manner approved for this material. Consult appropriate Federal, state and local regulatory agencies to ascertain proper disposal procedures.

Technical Service

Technical service is available to facilitate use of TDI. If you have a specific question or need further information, please write or call TDI Technical Service, Olin Research Center, 350 Knotter Drive, Cheshire, CT 06410; (203) 271-4000.

OLIN CHEMICALS SALES OFFICES

U.S.

Atlanta, GA 30328
1140 Hammond Dr.,
Suite 6150
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Telex
Western Union 62826
RCA 233320
ITT 4750119
Telefax (203) 356-2236/3288

EUROPE, MIDDLE EAST & AFRICA REGION
France
Olin Europe, S.A.
108-110, Boulevard Haussmann
75008 Paris, FRANCE
Telephone 33-1-293-3210
Telex 650769
Telefax 33-14-293-1067

Germany
Olin Chemicals GmbH
Harkorstrasse 32
4030 Ratingen, WEST GERMANY
Telephone 49-2102-470094
Telex 8585196
Telefax 49-2102-474805

United Kingdom
Olin U.K. Ltd.
Site 7, Kidderminster Road
Cutnall Green,
Worchestershire, ENGLAND WR9 ONS
Telephone 44-29-923-461
Telex 335258
Telefax 44-29-923-222

FAR EAST REGION
Area Office — Tokyo
Olin Japan, Inc.
Shiozaki Building
7-1 Hirakawa-Cho 2-Chome
Chiyoda-Ku
Tokyo 102, JAPAN
Telephone 81-3-263-4615
Telex 023 24031
Telefax 81-3-264-2750/2777

Taiwan
Olin Far East, Taiwan Branch
2F9 No. 2, Fu Hsing N. Road
Taipei, TAIWAN 105, R.O.C
Telephone 886-2-752-4413
Telex 19159
Telefax 886-2-741-2113

South Korea
Olin Far East Ltd., Korea Branch
80-6 Soosong-dong (Suktan Bldg.)
Chongro-ku, Seoul 110, KOREA
Telephone 82-2-737-2840/2841
Telefax 82-2-730-7387

LATIN AMERICA REGION
Brazil
Olin Brasil Ltda.
Ave. Brig. Luiz Antonio, 3779
Sao Paulo 01401, BRAZIL
Telephone 55-11-887-2050
Telex 11-25034

Colombia
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Bogota, COLOMBIA
Telephone 571-214-0591
Telex 45135

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Campos Eliseos No. 385
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Col. Polanco
Delg. Miguel Hidalgo
11560 Mexico, D.F., MEXICO
Telephone 55-5-259-0764/0889
Telex 017-74-578

Venezuela
Olin Quimica S.A.
Galipan Building
Piso 2, Entrance C
Av. Francisco Mirando
Apartado 3781
Chacao, Caracas, VENEZUELA
Telephone 951-2514/1867
Telex 27111

OCEANIA REGION
Area Office — Sydney
Olin Australia Ltd.
1-3 Atchison Street
P.O. Box 141
St. Leonards 2065, N.S.W., AUSTRALIA
Telephone 61-2-439-6222
Telex 26328
Telefax 61-2-439-4198

Hong Kong
Olin Industrial H.K. Ltd.
2101 International Bldg.
141 Des Voeux Road Central, HONG KONG
Telephone 852-5-438-151
Telex 83637
Telefax 852-5-419-840

Singapore
Olin Pte., Ltd.
7500 A Beach Road
#14-30607
The Plaza
SINGAPORE 0719
Telephone 6-011-65-2949856
Telex RS 35441

SOUTH AFRICA REGION
Area Office — Johannesburg
Olin Pty Ltd.
15 Spartan Crescent
Eastgate Ext. 3, R.S.A.
Telephone 27-11-802-2145/2146/2147
Telex 4-28007

Mailing Address
P.O. Box 114
Bergvlei 2012, R.S.A.

A WORD ABOUT OLIN CORPORATION

Olin is a leading participant in chemicals, electronics, metals and aerospace/defense. It has built a company of 16,000 people, supported by some of the most sophisticated research in the nation.

Olin Chemicals has been supplying America with basic inorganic chemicals for more than 90 years. Chlorine, caustic soda, sulfuric acid and sodium phosphates...plus a host of other products based on chlorine, sodium and nitrogen chemistry. And for 40 years, it has been producing organic chemicals from ethylene and propylene oxide: glycols, glycol ethers, polyglycols and surfactants. It's one of the world's largest producers of toluene diisocyanate for flexible urethane foam, as well as a supplier of the broadest line of nitrogen blowing agents for expanded plastics. And, it makes specialty chemicals for everything from antioxidants to water purification.

Olin Hunt Specialty Products is a leading manufacturer of photoresists, process chemicals and equipment for the semiconductor industry. It also produces chemical systems and equipment for printed wire boards. Olin Hunt is a major manufacturer and supplier of photographic processing systems. It manufactures electrostatic chemicals such as toners and developers for office copiers and high-speed computer printers. And it is also responsible for the activities of a number of wholly or partially owned companies in the electronics industry.

Olin Brass began during World War I as a producer of cartridge metal for Olin-produced ammunition. Today, it is the unquestioned leader in the field of specialty copper alloys. Olin Brass has a unique position as a supplier of high quality alloys for the automotive, housing and ammunition markets. And it is a prime supplier to the electronics industry with tissue-thin foils and high-performance alloys for lead frames. Olin Brass is also responsible for a number of subsidiary companies serving the electronics market with advanced materials like clad and inlay metals and with a new tape-automated bonding system for interconnecting semiconductor chips.

Olin Defense Systems includes operations serving the defense, aerospace and sporting ammunition markets. It produces world-famous Winchester sporting ammunition and is also the largest supplier of small and medium caliber rounds for the U.S. government. Olin Defense Systems produces *Ball Powder* propellant for ammunition and is deeply involved in solid propellant gas generators and jet engine starter cartridges for military aircraft. It produces small rocket engines for positioning spacecraft and satellites and is researching advanced concepts like electric propulsion systems. Its other activities include radiation simulator systems, power supplies and military electronics.

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120 Long Ridge Road, Stamford, Connecticut 06904

Olin MATERIAL SAFETY DATA

OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911

MSDS FILE 563

SECTION I - IDENTIFICATION

CHEMICAL NAME & SYNONYMS Toluene Diisocyanate 80-20		
CHEMICAL FAMILY Isocyanate	**FORMULA** $C_9H_6N_2O_2$	**PRODUCT** TDI 80-20
DESCRIPTION Clear water white to pale yellow liquid with sharp pungent odor		**CAS NO.** 26471-62-5

SECTION II - NORMAL HANDLING PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Harmful if swallowed. Avoid contact with eyes, skin or clothing. Upon contact with skin or eyes, wash off with water. Avoid breathing mist or vapor. Protect against physical damage. Store in a cool, dry, well-ventilated place, away from areas where a fire hazard may be acute. Outside or detached storage is preferred. Blanket storage tanks with inert gas (nitrogen) or dry air. Separate from oxidizing materials.

PROTECTIVE EQUIPMENT	VENTILATION REQUIREMENTS
EYES Goggles **GLOVES** Rubber, NBR or PVA **OTHER** Coveralls, impervious footwear	As required to keep airborne concentrations below TLV

SECTION III - HAZARDOUS INGREDIENTS

BASIC MATERIAL	OSHA PEL	LD50	LC50	SIGNIFICANT EFFECTS
*Toluene-2,4-diisocyanate (80%) CAS No.: 584-84-9	0.02 ppm ceiling	5.8 g/kg (rat)	10 ppm/4 hrs (mouse)	Skin, eye, mucous membrane irritation. Pulmonary irritant. Allergic sensitization to skin and respiratory tract. May cause asthma attacks.
*Toluene-2,6-diisocyanate(20%),CAS No.:91-08-7	None established	No data	11 ppm/4 hrs-mouse	Irritation

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 270°F COC **METHOD**	**OSHA CLASSIFICATION** Not Regulated (Ignitable)	**FLAMMABLE EXPLOSIVE LIMIT**	**LOWER** 0.9%	**UPPER** 9.5%

EXTINGUISHING MEDIA Water, carbon dioxide or dry chemical. Use water to keep the exposed containers cool.

SPECIAL FIRE HAZARD & FIRE FIGHTING PROCEDURES Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
0.005 ppm TWA, 0.02 ppm STEL - 2,4 TDI (ACGIH 1987-88)

SYMPTOMS OF OVER EXPOSURE May cause irritation to eyes, throat, lungs, stomach, skin. Allergic sensitization to skin and respiratory tract. May cause asthma attacks

EMERGENCY FIRST-AID PROCEDURES

SKIN Immediately flush thoroughly with water for 15 minutes, call a physician.

EYES Immediately flush thoroughly with water for 15 minutes, call a physician.

INGESTION Immediately drink large quantities of water to dilute.

INHALATION Immediately remove victim to fresh air. Call a physician.

PRODUCT CODE 898859 CHEMICAL NAME TDI 80-20

SECTION VI - TOXICOLOGY (PRODUCT)

ACUTE ORAL LD 50 5.8 g/kg (rats). Harmful if swallowed.
ACUTE DERMAL LD 50
> 2 g/kg (rabbits)
ACUTE INHALATION LC 50
10 ppm/4 hrs (mouse)

CARCINOGENICITY Oral Exposure-Positive NTP Bioassay
MUTAGENICITY Not known to be mutagenic
EYE IRRITATION Irritation and/or burns
PRIMARY SKIN IRRITATION
Irritation and/or burns

PRINCIPAL ROUTES OF ABSORPTION
Inhalation, dermal contact

EFFECTS OF ACUTE EXPOSURE May cause irritation to lungs, eyes, throat, stomach, skin. Allergic sensitization of skin and respiratory tract. Corneal injury may occur.

EFFECTS OF CHRONIC EXPOSURE Damage/allergic sensitization to lungs. Inhalation studies indicate not carcinogenic. Carcinogenic risk from industrial use is not significant.

SECTION VII - SPILL AND LEAKAGE PROCEDURES (CONTROL PROCEDURES)

ACTION FOR MATERIAL RELEASE OR SPILL
Wear NIOSH/MSHA approved positive pressure supplied air respirator. Follow OSHA regulations for respirator use (see 29 CFR 1910.134). Wear goggles, coveralls and impervious gloves and boots. Add dry non-combustible absorbent; sweep up material and place in an approved DOT container. Add an equal amount of neutralizing solution to the container (90-95% water, 5-10% ammonia). Clean remaining surfaces with neutralizing solution and add this to container. Isolate container in a well-ventilated place and do not seal for 24 hrs. Ammonia vapors may be generated until solution is neutralized. Wash all contaminated clothing before reuse. In the event of a large spill use the telephone number shown on the front of this sheet.

TRANSPORTATION EMERGENCY, CONTACT CHEMTREC 800-424-9300

THE MIXTURE OR TRADE NAME PRODUCT HEREIN CONTAINS A TOXIC CHEMICAL(S) SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372. THE SARA 313 CHEMICALS ARE LISTED IN SECTION III AND ARE INDICATED BY AN ASTERISK (*).

SECTION VIII - SHIPPING DATA

D.O.T. Toluene diisocyanate Poison B UN 2078

SECTION IX - REACTIVITY DATA

STABLE x UNSTABLE AT____C ____ F	HAZARDOUS POLYMERIZATION	MAY OCCUR	x
		WILL NOT OCCUR	

CONDITIONS TO AVOID
Water or incompatible materials in a closed system, excess heat
INCOMPATIBILITY(MATERIAL TO AVOID)
Acids, bases and alcohols, surface active materials
HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, nitrogen oxides, hydrogen cyanide

SECTION X - PHYSICAL DATA

MELTING POINT 53-56°F	VAPOR PRESSURE .01mmHg,20°C	VOLATILES No data
BOILING POINT 484°F	SOLUBILITY IN WATER Insoluble	EVAPORATION RATE No data
SPECIFIC GRAVITY(H2O=1) 1.22	PH No data	VAPOR DENSITY(AIR=1) 6.0

INFORMATION: FURNISHED TO **FURNISHED BY** **DATE** DECEMBER 5, 1988

Department of Environmental Hygiene and Toxicology
(203) 789-5436

Olin CORPORATION
120 Long Ridge Road, Stamford, Connecticut 06904
OCEAN® Network
EMERGENCY PHONE 1-800-OLIN-911